

29 November 2012 | 44 pages

Pharmaceuticals (GICS) | Drugs (Citi)  
North America | United States

## Merck & Co (MRK)

### Use IMPROVE-IT Disappointment to Revisit Stock Later. Neutral.

- Company Update
- Initiation of Coverage

■ **We don't like the near-term risk/reward at current valuation.** High margin/low tax Zetia/Vytorin (cardiovascular) sales will rapidly decline on the back of anticipated negative data from the IMPROVE-IT trial ('14), we believe. Our 2015 non-GAAP EPS is 13% lower than consensus, despite an assumed \$5.5bn/annum buyback. Our '14-'19 non-GAAP EPS CAGR is 4% vs. 7% for the US sector. Our TP of \$44 puts the stock on a 12.2x '14 multiple, a 2% discount to the US sector. We would use likely IMPROVE-IT share price weakness to revisit our thesis. We prefer Buy-rated Pfizer and Lilly (US) and Bayer, Sanofi and Novo (EU).

■ **Limited ability to offset likely Zetia/Vytorin driven EPS collapse through cost reduction,** given the need to launch Tredaptive (cardio) and the primary care pipeline simultaneously. We place an 80% probability on HPS-THRIVE2 (due H1 2013) showing a significant CV benefit with Tredaptive. Our estimates reflect \$1bn COGS reduction due to manufacturing rationalization and a ~\$2bn reduction in working capital following completion of the >\$500m COMET IT programme.

■ **More favorable US environment should drive Januvia (diabetes) and odanacatib (osteoporosis) growth long term.** Greater payer/provider alignment in the US through pay for performance bonuses and PCMHs should increase diagnosis and treatment for both diabetes and osteoporosis. We highlight our companion report, [Pharma: I Pay, You Pay, He Pays, Won't Pay?](#) published today.

■ **Odanacatib has \$2.6bn (\$2.2bn risk-adjusted) long-term potential despite high formulary barriers.** In the absence of cathepsin K related adverse events, Merck will likely slowly rebuild the osteoporosis market, partly through highlighting differentiation from "untrusted" and poorly tolerated bisphosphonates.

■ **Cardiovascular outcomes trial and once weekly formulation drive Januvia (diabetes) upside.** We estimate Januvia revenues of \$9.8bn in 2020. Competition is likely to increase through rebating and further partnering.

|                              |              |
|------------------------------|--------------|
| <b>Neutral</b>               | <b>2</b>     |
| Price (28 Nov 12)            | US\$43.82    |
| Target price                 | US\$44.00    |
| Expected share price return  | 0.4%         |
| Expected dividend yield      | 3.8%         |
| <b>Expected total return</b> | <b>4.2%</b>  |
| Market Cap                   | US\$133,216M |

#### Price Performance (RIC: MRK.N, BB: MRK US)



|                    | 2010A  | 2011A  | 2012E  | 2013E  | 2014E  |
|--------------------|--------|--------|--------|--------|--------|
| Sales (\$m)        | 45,987 | 48,047 | 47,037 | 44,392 | 43,918 |
| Net Income (\$m)   | 861    | 6,272  | 6,539  | 6,721  | 6,745  |
| Diluted EPS (\$)   | 3.43   | 3.78   | 3.78   | 3.66   | 3.60   |
| PE (x)             | 12.9   | 11.7   | 11.7   | 12.1   | 12.3   |
| EV/EBITDA (x)      | 13.8   | 8.8    | 8.0    | 7.9    | 7.9    |
| DPS (\$)           | 1.52   | 1.56   | 1.68   | 1.68   | 1.68   |
| Dividend Yield (%) | 3.4    | 3.5    | 3.8    | 3.8    | 3.8    |

#### Andrew S Baum

+44-20-7986-4498  
andrew.baum@citi.com

Liav Abraham

Mark Dainty, ACA

Joanne Jerman

Matthew M Hartley

Ramaswamy Narayanan, CFA

Nirav Jhaveri, CFA

#### See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the Firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

| MRK.N: Fiscal year end 31-Dec |                |                |                |                |               | Price: US\$43.82; TP: US\$44.00; Market Cap: US\$133,216m; Recomm: Neutral |               |               |               |               |                |
|-------------------------------|----------------|----------------|----------------|----------------|---------------|--|---------------|---------------|---------------|---------------|----------------|
| Profit & Loss (US\$m)         | 2010           | 2011           | 2012E          | 2013E          | 2014E         | Valuation ratios   | 2010          | 2011          | 2012E         | 2013E         | 2014E          |
| Sales revenue                 | 45,987         | 48,047         | 47,037         | 44,392         | 43,918        | PE (x)   | 12.8          | 11.6          | 11.6          | 12.0          | 12.2           |
| Cost of sales                 | -18,396        | -16,871        | -16,486        | -15,128        | -14,024       | PB (x)   | 2.5           | 2.4           | 2.4           | 2.4           | 2.5            |
| Gross profit                  | 27,591         | 31,176         | 30,551         | 29,265         | 29,895        | EV/EBITDA (x)  | 6.5           | 5.8           | 5.7           | 5.8           | 6.0            |
| Gross Margin (%)              | 60.0           | 64.9           | 65.0           | 65.9           | 68.1          | FCF yield (%)  | 6.7           | 7.9           | 9.4           | 9.4           | 9.4            |
| EBITDA (Adj)                  | 21,710         | 23,627         | 23,138         | 21,909         | 20,937        | Dividend yield (%)   | 3.5           | 3.6           | 3.8           | 3.8           | 3.8            |
| EBITDA Margin (Adj) (%)       | 47.2           | 49.2           | 49.2           | 49.4           | 47.7          | Payout ratio (%)   | 44            | 41            | 44            | 46            | 47             |
| Depreciation                  | -7,381         | -7,427         | -7,028         | -6,927         | -6,423        | ROE (%)  | 1.5           | 11.5          | 12.1          | 12.6          | 13.2           |
| Amortisation                  | 0              | 0              | 0              | 0              | 0             | <b>Cashflow (US\$m)</b>  |               |               |               |               |                |
| EBIT (Adj)                    | 14,329         | 16,200         | 16,111         | 14,983         | 14,514        | EBITDA   | 10,338        | 15,707        | 16,817        | 16,412        | 16,045         |
| EBIT Margin (Adj) (%)         | 31.2           | 33.7           | 34.3           | 33.8           | 33.0          | Working capital  | 1,090         | -504          | 1,133         | 740           | 554            |
| Net interest                  | -632           | -551           | -470           | -494           | -479          | Other  | -606          | -2,820        | -3,131        | -2,652        | -2,765         |
| Associates                    | 0              | 0              | 0              | 0              | 0             | <b>Operating cashflow</b>  | <b>10,822</b> | <b>12,383</b> | <b>14,819</b> | <b>14,500</b> | <b>13,834</b>  |
| Non-op/Except                 | -671           | -396           | -105           | 0              | 0             | Capex  | -1,678        | -1,723        | -2,205        | -2,183        | -1,883         |
| Pre-tax profit                | 1,654          | 7,333          | 9,215          | 8,992          | 9,143         | Net acq/disposals  | -2,892        | -1,051        | 0             | 0             | 0              |
| Tax                           | -672           | -941           | -2,556         | -2,158         | -2,286        | Other  | 1,073         | -116          | -200          | -204          | -208           |
| Extraord./Min.Int./Pref.div.  | -121           | -120           | -120           | -113           | -112          | <b>Investing cashflow</b>  | <b>-3,497</b> | <b>-2,890</b> | <b>-2,405</b> | <b>-2,387</b> | <b>-2,091</b>  |
| Reported net profit           | 861            | 6,272          | 6,539          | 6,721          | 6,745         | Dividends paid   | -4,853        | -4,811        | -5,228        | -5,082        | -4,930         |
| Net Margin (%)                | 1.9            | 13.1           | 13.9           | 15.1           | 15.4          | <b>Financing cashflow</b>  | <b>-5,441</b> | <b>-6,904</b> | <b>-7,302</b> | <b>-7,982</b> | <b>-10,463</b> |
| Core NPAT                     | 10,715         | 11,698         | 11,591         | 10,898         | 10,414        | <b>Net change in cash</b>  | <b>1,589</b>  | <b>2,631</b>  | <b>5,111</b>  | <b>4,131</b>  | <b>1,279</b>   |
| <b>Per share data</b>         |                |                |                |                |               | <b>Free cashflow to s/holders</b>  | <b>9,144</b>  | <b>10,660</b> | <b>12,614</b> | <b>12,317</b> | <b>11,951</b>  |
| Reported EPS (\$)             | 0.28           | 2.03           | 2.13           | 2.25           | 2.33          |  |               |               |               |               |                |
| Core EPS (\$)                 | 3.43           | 3.78           | 3.78           | 3.66           | 3.60          |  |               |               |               |               |                |
| DPS (\$)                      | 1.52           | 1.56           | 1.68           | 1.68           | 1.68          |  |               |               |               |               |                |
| CFPS (\$)                     | 3.47           | 4.00           | 4.84           | 4.86           | 4.79          |  |               |               |               |               |                |
| FCFPS (\$)                    | 2.93           | 3.45           | 4.12           | 4.13           | 4.13          |  |               |               |               |               |                |
| BVPS (\$)                     | 17.64          | 17.93          | 18.02          | 18.03          | 17.48         |  |               |               |               |               |                |
| Wtd avg ord shares (m)        | 3,095          | 3,071          | 3,040          | 2,958          | 2,868         |  |               |               |               |               |                |
| Wtd avg diluted shares (m)    | 3,120          | 3,094          | 3,063          | 2,981          | 2,891         |  |               |               |               |               |                |
| <b>Growth rates</b>           |                |                |                |                |               |  |               |               |               |               |                |
| Sales revenue (%)             | 67.7           | 4.5            | -2.1           | -5.6           | -1.1          |  |               |               |               |               |                |
| EBIT (Adj) (%)                | 54.8           | 13.1           | -0.6           | -7.0           | -3.1          |  |               |               |               |               |                |
| Core NPAT (%)                 | 44.6           | 9.2            | -0.9           | -6.0           | -4.4          |  |               |               |               |               |                |
| Core EPS (%)                  | 5.4            | 10.1           | 0.1            | -3.4           | -1.5          |  |               |               |               |               |                |
| <b>Balance Sheet (US\$m)</b>  |                |                |                |                |               |  |               |               |               |               |                |
| Cash & cash equiv.            | 12,201         | 14,972         | 20,083         | 24,214         | 25,493        |  |               |               |               |               |                |
| Accounts receivables          | 7,344          | 8,261          | 7,638          | 7,209          | 7,132         |  |               |               |               |               |                |
| Inventory                     | 5,868          | 6,254          | 6,046          | 5,215          | 4,723         |  |               |               |               |               |                |
| Net fixed & other tangibles   | 22,708         | 22,032         | 22,205         | 22,279         | 22,001        |  |               |               |               |               |                |
| Goodwill & intangibles        | 51,834         | 46,457         | 41,662         | 37,049         | 32,995        |  |               |               |               |               |                |
| Financial & other assets      | 5,826          | 7,152          | 7,152          | 7,152          | 7,152         |  |               |               |               |               |                |
| <b>Total assets</b>           | <b>105,781</b> | <b>105,128</b> | <b>104,787</b> | <b>103,117</b> | <b>99,496</b> |  |               |               |               |               |                |
| Accounts payable              | 2,308          | 2,462          | 2,622          | 2,129          | 2,102         |  |               |               |               |               |                |
| Short-term debt               | 2,400          | 1,990          | 1,990          | 1,990          | 1,990         |  |               |               |               |               |                |
| Long-term debt                | 15,482         | 15,525         | 15,525         | 15,525         | 15,525        |  |               |               |               |               |                |
| Provisions & other liab       | 28,786         | 28,208         | 28,350         | 28,322         | 28,335        |  |               |               |               |               |                |
| <b>Total liabilities</b>      | <b>48,976</b>  | <b>48,185</b>  | <b>48,487</b>  | <b>47,966</b>  | <b>47,951</b> |  |               |               |               |               |                |
| Shareholders' equity          | 54,376         | 54,517         | 53,874         | 52,725         | 49,119        |  |               |               |               |               |                |
| Minority interests            | 2,429          | 2,426          | 2,426          | 2,426          | 2,426         |  |               |               |               |               |                |
| <b>Total equity</b>           | <b>56,805</b>  | <b>56,943</b>  | <b>56,300</b>  | <b>55,151</b>  | <b>51,545</b> |  |               |               |               |               |                |
| <b>Net debt</b>               | <b>5,681</b>   | <b>2,543</b>   | <b>-2,568</b>  | <b>-6,699</b>  | <b>-7,978</b> |  |               |               |               |               |                |
| Net debt to equity (%)        | 10.0           | 4.5            | -4.6           | -12.1          | -15.5         |  |               |               |               |               |                |


For further data queries on Citi's full coverage universe please contact Citi Research Data Services at CitiRsch.DataServices.Global@citi.com  
For definitions of the items in this table, please click [here](#).

# Contents

|  |           |
|--|-----------|
| <b>Favoured Names and Profiles</b>                               | <b>4</b>  |
| <b>Valuation</b>   | <b>5</b>  |
| <b>Summary &amp; Investment Conclusion</b>                       | <b>6</b>  |
| <b>Valuation</b>   | <b>10</b> |
| <b>Risks To Investment Thesis</b>                                | <b>12</b> |
| <b>Downside Risks</b>  | <b>12</b> |
| <b>Upside Risks</b>  | <b>12</b> |
| <b>Pleasure before Pain: CV Franchise?</b>                       | <b>13</b> |
| <b>Anacetrapib: Does it lower LDL enough?</b>                    | <b>16</b> |
| <b>Odanacatib: Slow Blockbuster</b>                              | <b>18</b> |
| <b>Merck's Januvia franchise on the way to \$9.8bn per annum</b> | <b>23</b> |
| <b>Financials</b>  | <b>28</b> |
| <b>Key Catalysts</b>   | <b>35</b> |
| <b>Merck &amp; Co</b>  | <b>36</b> |
| <b>Appendix A-1</b>  | <b>39</b> |

# Favoured Names and Profiles

Figure 1. Pfizer, Lilly and Forest are our most favoured US names. Bayer, Sanofi and Novo are our most favoured EU names.

|   |                      | Rating  | Price Target | Investment Thesis                               | "Shrink, Smarten, Spin" | Biologics | Vaccines | Diagnostics | Consumer Health | Emerging Markets | Generics | Animal Health |
|---|----------------------|---------|--------------|---|-------------------------|-----------|----------|-------------|-----------------|------------------|----------|---------------|
|  <p>Most Favoured</p> | Bayer                | Buy     | €75.00       | Xarelto, Emerging Markets                       | ✓                       | ✓✓        |          | ✓           | ✓✓✓             | ✓✓               | ✓        | ✓             |
|   | Pfizer               | Buy     | \$29.00      | Cost, WC De-equitisation                        | ✓✓✓                     | ✓✓        | ✓✓       |             |                 | ✓✓               | ✓        | ✓✓✓           |
|   | Eli Lilly            | Buy     | \$55.00      | Pipeline base incl. Alimta, EM                  | ✓✓✓                     | ✓✓✓       |          |             |                 | ✓                |          | ✓✓            |
|   | Sanofi               | Buy     | €80.00       | Return to sustainable growth                    | ✓✓✓                     | ✓         | ✓✓✓      |             | ✓✓✓             | ✓✓✓              | ✓        | ✓✓✓           |
|   | Novo Nordisk         | Buy     | DKK 1075.00  | Emerging market, diabetes                       | ✓                       | ✓✓✓       |          |             |                 | ✓✓               |          |               |
|   | Forest Labs          | Buy     | \$40.00      | Pipeline, Commercial launches                   | ✓✓✓                     |           |          |             |                 |                  |          |               |
|   | Allergan             | Buy     | \$106.00     | Sustainable growth, Innovation                  | ✓✓                      | ✓✓        |          |             |                 | ✓✓               |          |               |
|   | GlaxoSmithKline      | Buy     | £16.10       | Pharma 2.0 diversification                      | ✓✓✓                     | ✓         | ✓✓✓      |             | ✓✓✓             | ✓✓               |          |               |
|   | Shire                | Buy     | £22.50       | Rare diseases innovation                        | ✓✓                      | ✓✓        |          |             |                 | ✓                |          |               |
|   | Novartis             | Neutral | CHF 57.00    | Innovations vs Generics                         | ✓                       | ✓         | ✓        | ✓           | ✓               | ✓                | ✓✓✓      | ✓             |
|   | Roche                | Neutral | CHF 157.00   | Innovation, pertuzumab                          | ✓✓                      | ✓✓✓       |          | ✓✓✓         |                 | ✓✓               |          |               |
|   | Merck KGaA           | Neutral | €83.00       | Cost cutting, business development              | ✓                       | ✓✓        | ✓        | ✓           | ✓               | ✓                |          |               |
|   | Bristol Myers-Squibb | Neutral | \$33.00      | Pipeline, Dividend                              | ✓✓✓                     | ✓✓✓       |          |             |                 | ✓                |          |               |
| Least Favoured  | Merck & Co           | Neutral | \$44.00      | Cost, WC reduction pipeline                     |                         | ✓✓        | ✓✓✓      |             | ✓               | ✓                |          | ✓✓✓           |
|   | AstraZeneca          | Neutral | £30.00       | Shrink research. De-equitisation growth drivers | ✓✓                      | ✓         | ✓        |             |                 | ✓                |          |               |

Source: Citi Research

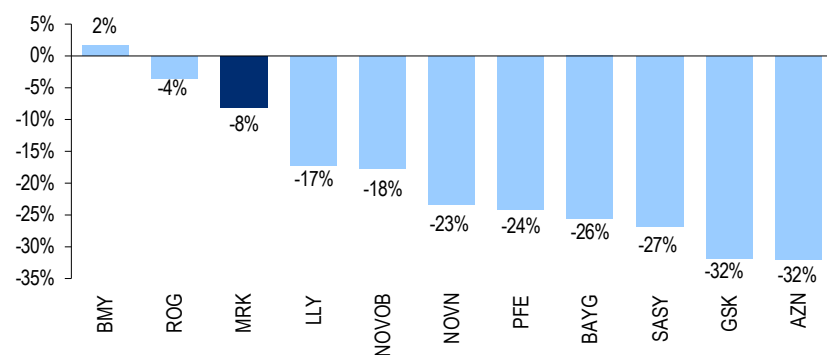
# Valuation

Figure 2. Large Cap Pharma Summary Valuation

|  | RIC      | Current/ | Mkt Cap | Rating/ | Target |          |     | % upside / | Implied    | PE    |       | 2013-2018E CAGR |       | 2014 -2019R CAGR |       | Dividend Yield |       |
|--|----------|----------|---------|---------|--------|----------|-----|------------|------------|-------|-------|-----------------|-------|------------------|-------|----------------|-------|
|  |          | Price    | (\$bn)  | Risk    | Price  | % Upside | ETR | downside   | Terminal   | 2013E | 2014E | Sales           | EPS   | Sales            | EPS   | 2013E          | 2014E |
|  |          |          |         |         |        |          |     | To IV      | Growth (%) |       |       |                 |       |                  |       |                |       |
| US Large Cap Pharma                      |          |          |         |         |        |          |     |            |            |       |       |                 |       |                  |       |                |       |
| Abbott Labs                              | ABT      | 64.6     | 102.1   | Sell    | 60.0   | -7%      | -4% | NA         | NA         | 12.9  | 12.2  | NA              | NA    | NA               | NA    | 3.4%           | 3.6%  |
| Bristol Myers                            | BMJ      | 32.7     | 54.0    | Neutral | 33.0   | 1%       | 5%  | 2%         | 3%         | 18.0  | 15.8  | 6.6%            | 10.3% | 5.7%             | 10.2% | 4.2%           | 4.4%  |
| Eli Lilly                                | LLY      | 48.0     | 55.7    | Buy     | 55.0   | 14%      | 19% | -17%       | 0%         | 12.9  | 19.6  | -0.7%           | 3.5%  | 4.6%             | 16.1% | 4.1%           | 4.1%  |
| Johnson & Johnson                        | JNJ      | 69.3     | 192.0   | Buy     | 80.0   | 15%      | 19% | NA         | NA         | 13.0  | 12.0  | NA              | NA    | NA               | NA    | 3.7%           | 4.0%  |
| Merck                                    | MRK      | 44.6     | 135.6   | Neutral | 44.0   | -1%      | 2%  | -8%        | 0%         | 12.2  | 12.4  | 0.1%            | 2.2%  | 1.1%             | 3.9%  | 3.8%           | 3.8%  |
| Pfizer                                   | PFE      | 24.7     | 181.6   | Buy     | 29.0   | 18%      | 21% | -24%       | -5%        | 10.8  | 10.4  | 1.8%            | 6.1%  | 1.9%             | 6.0%  | 4.0%           | 4.3%  |
| US Large-cap Pharma (mkt-cap wt avg)     |          |          |         |         |        |          |     |            |            | 12.6  | 12.6  | 1.5%            | 5.0%  | 2.5%             | 7.2%  | 3.8%           | 4.0%  |
| European Large Cap Pharma                |          |          |         |         |        |          |     |            |            |       |       |                 |       |                  |       |                |       |
| AstraZeneca                              | AZN.L    | 29.3     | 58.4    | Neutral | 30.0   | 2%       | 9%  | -32%       | -6%        | 8.4   | 8.5   | -2.5%           | -4.0% | -1.9%            | -3.0% | 6.4%           | 6.7%  |
| Bayer                                    | BAYG.DE  | 70.3     | 75.3    | Buy     | 75.0   | 7%       | 9%  | -26%       | -3%        | 11.0  | 9.9   | 4.0%            | 6.8%  | 3.8%             | 5.3%  | 3.0%           | 3.2%  |
| GlaxoSmithKline                          | GSK.L    | 1,343    | 105.6   | Buy     | 1,610  | 20%      | 26% | -32%       | -4%        | 11.1  | 9.7   | 3.0%            | 8.3%  | 2.6%             | 6.3%  | 5.8%           | 6.1%  |
| Novartis                                 | NOVN.VX  | 57.3     | 166.9   | Neutral | 57.0   | -1%      | 3%  | -23%       | -3%        | 11.1  | 10.0  | 2.7%            | 7.0%  | 1.8%             | 5.8%  | 4.2%           | 4.6%  |
| Novo-Nordisk                             | NOVOB.CO | 917.5    | 87.8    | Buy     | 1075.0 | 17%      | 19% | -18%       | 1%         | 20.4  | 17.4  | 8.1%            | 13.8% | 6.8%             | 10.7% | 2.6%           | 3.0%  |
| Roche                                    | ROG.VX   | 181.5    | 168.9   | Neutral | 180.0  | -1%      | 3%  | -4%        | -1%        | 11.7  | 11.2  | 3.0%            | 4.8%  | 3.1%             | 3.3%  | 4.5%           | 4.9%  |
| Sanofi                                   | SASY.PA  | 69.5     | 119.1   | Buy     | 80.0   | 15%      | 19% | -27%       | -2%        | 10.9  | 9.5   | 4.8%            | 9.2%  | 4.6%             | 7.1%  | 4.6%           | 5.4%  |
| EU Large-cap Pharma (mkt-cap wt avg)     |          |          |         |         |        |          |     |            |            | 12.0  | 10.9  | 3.5%            | 7.0%  | 3.1%             | 5.4%  | 4.4%           | 4.8%  |
| Global Large-cap Pharma (mkt-cap wt avg) |          |          |         |         |        |          |     |            |            | 12.3  | 11.7  | 2.8%            | 6.3%  | 2.9%             | 6.0%  | 4.1%           | 4.4%  |

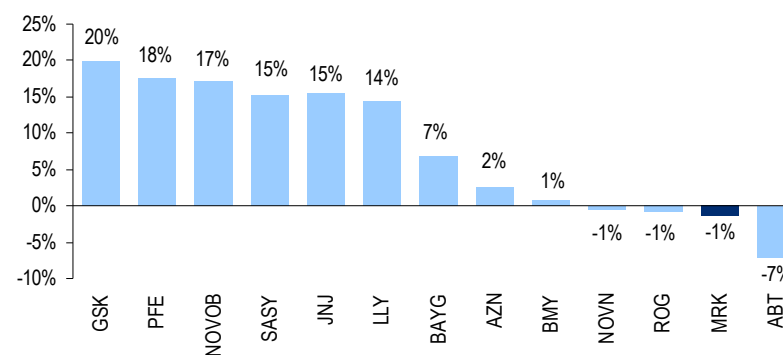
Source: Citi Research

Figure 3. Discount to DCF-derived Intrinsic Value



Source: Citi Research

Figure 4. Upside / Downside to Target Price



Source: Citi Research

## Summary & Investment Conclusion

**We initiate coverage on Merck with a Neutral rating and a \$44 target.** We anticipate a 2% non-GAAP EPS CAGR between 2014 and 2019 compared with 7% for the US sector. Our near-term view on the stock is colored by our negative assessment of the outcome of the IMPROVE-IT trial with Vytarin. We anticipate significant revenue, EBIT and post tax earnings decline for both Vytarin and Zetia ahead of its 2017 patent expiration. Longer term, we are optimistic about the potential for Tredaptive (cardiovascular), odanacatib (osteoporosis) and suvorexant (insomnia).

Our Target Price of \$44 puts the stock on a 12.2x multiple of 2014 non-GAAP EPS, a 2% discount to the '14 US pharmaceutical sector and a 5% premium to the global pharmaceutical sector. Our DCF-derived intrinsic value is \$49, 11% ahead of the current share price, but reflecting notably less upside than other BUY-rated US names, Lilly and Pfizer. We would use share price weakness around the IMPROVE-IT data to revisit the stock, given our observation that on a DCF basis, the current share price is already discounting the likely failure of IMPROVE-IT.

CV franchise poses greatest  
downside/upside risk to Merck.

Figure 5. Key revenue estimates

| \$ mlns (except per share) | 2012E         | 2013E         | 2014E         | 2015E         | 2016E         | 2017E         | 2018E         | 2019E         | 2020E         | 2021E         |
|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>In-Market</b>           |               |               |               |               |               |               |               |               |               |               |
| Zetia                      | 2,575         | 2,795         | 2,707         | 2,166         | 1,733         | 778           | 414           | 321           | 264           | 218           |
| % Growth                   | 6.1%          | 8.5%          | -3.1%         | -20.0%        | -20.0%        | -55.1%        | -46.7%        | -22.5%        | -17.7%        | -17.5%        |
| Vytarin                    | 1,744         | 1,703         | 1,630         | 1,237         | 1,005         | 634           | 372           | 296           | 238           | 191           |
| % Growth                   | -7.4%         | -2.4%         | -4.3%         | -24.1%        | -18.8%        | -36.9%        | -41.4%        | -20.5%        | -19.6%        | -19.5%        |
| Zetia/Vytarin franchise    | 4,319         | 4,498         | 4,337         | 3,403         | 2,737         | 1,412         | 786           | 617           | 502           | 409           |
| % Growth                   | 0.2%          | 4.1%          | -3.6%         | -21.5%        | -19.6%        | -48.4%        | -44.3%        | -21.6%        | -18.6%        | -18.5%        |
| Januvia/Janumet            | 5,692         | 6,486         | 6,971         | 7,531         | 8,082         | 8,776         | 9,106         | 9,358         | 9,751         | 9,343         |
| % Growth                   | 21.4%         | 14.0%         | 7.5%          | 8.0%          | 7.3%          | 8.6%          | 3.8%          | 2.8%          | 4.2%          | -4.2%         |
| <b>Pipeline</b>            |               |               |               |               |               |               |               |               |               |               |
| Tredaptive                 | -             | -             | 270           | 675           | 1,080         | 1,466         | 1,858         | 2,201         | 2,460         | 2,624         |
| % Growth                   |               |               |               | 150.0%        | 60.0%         | 35.8%         | 26.7%         | 18.5%         | 11.8%         | 6.7%          |
| anacetrapib (MK-0859)      | -             | -             | -             | -             | 100           | 250           | 400           | 543           | 688           | 815           |
| % Growth                   |               |               |               |               |               | 150.0%        | 60.0%         | 35.8%         | 26.7%         | 18.5%         |
| odanacatib (MK-0822)       | -             | -             | 203           | 506           | 945           | 1,308         | 1,517         | 1,828         | 2,090         | 2,169         |
| % Growth                   |               |               |               | 149.2%        | 86.8%         | 38.5%         | 16.0%         | 20.4%         | 14.3%         | 3.8%          |
| suvorexant (MK-4305)       | -             | 125           | 311           | 498           | 676           | 857           | 1,015         | 1,134         | 1,210         | 1,245         |
| % Growth                   |               |               |               | 60.0%         | 35.8%         | 26.7%         | 18.5%         | 11.8%         | 6.7%          | 2.9%          |
| Total pipeline             | -             | 181           | 1,075         | 2,484         | 4,356         | 6,391         | 8,373         | 10,710        | 12,554        | 13,680        |
| % Growth                   |               |               | 492.6%        | 131.0%        | 75.4%         | 46.7%         | 31.0%         | 27.9%         | 17.2%         | 9.0%          |
| <b>Group Sales</b>         | <b>47,035</b> | <b>44,392</b> | <b>43,918</b> | <b>43,393</b> | <b>44,002</b> | <b>44,271</b> | <b>44,559</b> | <b>46,274</b> | <b>48,151</b> | <b>48,720</b> |
| % Growth                   | -2.1%         | -5.6%         | -1.1%         | -1.2%         | 1.4%          | 0.6%          | 0.6%          | 3.9%          | 4.1%          | 1.2%          |
| <b>Consensus</b>           | <b>47,018</b> | <b>45,844</b> | <b>46,474</b> | <b>47,569</b> | <b>49,069</b> |               |               |               |               |               |
| High                       | 47,162        | 47,008        | 48,307        | 49,251        | 50,415        |               |               |               |               |               |
| Low                        | 46,885        | 45,042        | 44,077        | 46,064        | 46,887        |               |               |               |               |               |
| # Contributors             | 18            | 18            | 15            | 9             | 8             |               |               |               |               |               |
| <b>Citi vs. cons</b>       | <b>0.0%</b>   | <b>-3.2%</b>  | <b>-5.5%</b>  | <b>-8.8%</b>  | <b>-10.3%</b> |               |               |               |               |               |

Source: Citi Research, FactSet consensus estimates

**Merck's cardiovascular franchise: the biggest risk, the greatest opportunity.**

Given our analysis of the negative ENHANCE and ARBITER-6 trial data, we anticipate IMPROVE-IT will likely not demonstrate a statistically significant benefit with Vytorin, resulting in the loss of \$2bn of revenues ahead of the April 2017 global patent expiries. Our '12-'16 non GAAP EPS estimates are 0-20% below consensus, predominantly due to our downbeat assessment of IMPROVE-IT, even after modeling a ~\$5.5bn/annum share buyback to offset the earnings decline and some modest additional cost reduction programs.

**We believe the IMPROVE-IT trial will fail to show a CV benefit for Vytorin vs. simvastatin monotherapy. This drives our below consensus EPS estimates.**

The magnitude of the earnings decline driven by our Zetia and Vytorin forecasts reflects:

1. the assumed 90% operating margin for Zetia and Vytorin
2. the assumed 20% tax rate (500bps lower than the group effective rate) given a large part of Zetia and Vytorin cash flows are generated outside the US to minimize tax exposure
3. Merck's limited ability to reduce operating expenses given the need to launch Tredaptive (where we are very optimistic about the outcome of the HPS2-THRIVE phase III trial) and primary care products odanacatib (osteoporosis) and suvorexant (insomnia).

A positive outcome for IMPROVE-IT would increase our non-GAAP EPS by 5-23% for 2014-17 and our DCF-derived Intrinsic Value by 3% (~\$1.65/share). *Pages 13-15.*

**We are more optimistic on the prospects for Tredaptive. We forecast \$2.5bn in risk-adjusted sales by 2020.**

**We are much more optimistic on Tredaptive ahead of the HPS2-THRIVE trial (release expected Q113).** We anticipate \$2.5bn of risk-adjusted sales in 2020. We believe the failure of the recent AIM-HIGH data to show a reduction in cardiovascular events with niacin was a reflection of a low LDL baseline and an underpowered trial. *Page 15.*

**Anacetrapib represents a low probability, high potential call option at current levels.**

**Anacetrapib – low probability, high potential.** The outlook for anacetrapib (cardiovascular) is unclear given the backdrop of two failed phase III trials with CETP inhibitors – Roche's dalcetrapib most recently and Pfizer's torcetrapib. For us, the key question is whether anacetrapib lowers LDL cholesterol sufficiently to translate into a clinical benefit. We note Merck's recent press release downgrading the estimate of LDL-C reduction with the drug in the phase II trial. We anticipate heavily risk-adjusted sales of ~\$800m by 2021. In our view, anacetrapib remains a low probability, high potential call option for investors. *Pages 16-17.*

**CV outcome trial conclusion should free up ~\$1.3bn in opex.**

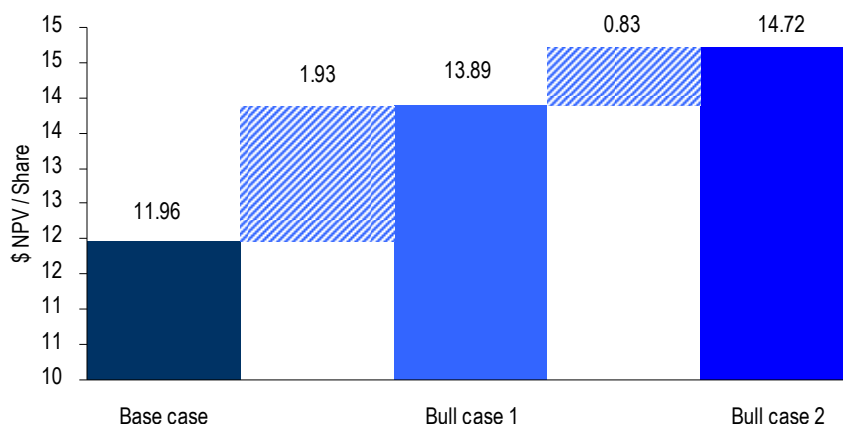
**Conclusion of CV outcome studies should release ~\$1.3bn in annual expenses.** The conclusion of these large cardiovascular programmes (c.18,000, 25,700 and 30,000 patients in size respectively), coupled with that of TECOS, the Januvia outcomes trial (another 14,000 patients), will free up operating expenses of an estimated \$1.3bn per annum. Management has indicated that this will be reinvested, however.

**We forecast \$9.8bn peak sales for Januvia franchise. CV outcomes benefit key source of upside not captured in base case estimates.**

**Januvia demographics, PCMHs and cardiovascular outcomes data look set to drive revenues to \$9.8bn in 2020.** The strong demographics of diabetes in both the US and EMEA, coupled with the emergence of PCMH (patient-centered medical homes) in the US will likely continue to drive upside to Januvia franchise forecasts. We anticipate global sales of \$9.8bn for the Januvia franchise in 2020. Our forecasts anticipate DPP-4 market share in the US to increase from 8% to 14% by 2017. Evidence that DPP-4s lower cardiovascular events from BMJ/AZN's SAVOR, Merck's TECOS or LLY/BI's CAROLINA trials would likely further accelerate market

share gains at the expense of the older genericised sulphonylurea class, which still accounts for c.37% of the market in terms of patient days of therapy. We estimate the NPV of Merck's Januvia franchise is ~\$12 per share (25% of Citi's Intrinsic Value), and the NPV of favorable CV outcomes data from the TECOS trial an incremental \$1.90-2.80/share (see scenarios in Figure 6 below). *Pages 23-27.*

**Figure 6. Positive CV outcomes data for DPP-4 inhibitor class/Januvia alone worth ~\$1.90-\$2.80/share (4-6% of our IV)**



Source: Citi Research; Bull case 1 reflects a scenario in which all DPP-4 inhibitors show a CV benefit, the market expands 50% and each drug captures 30% of this; Bull case 2 reflects a scenario in which only Januvia shows a CV benefit, the market expands 33% and Januvia captures 60% of this.

**Odanacatib success dependent on safety profile and MRK's ability to rebuild US osteoporosis market.**

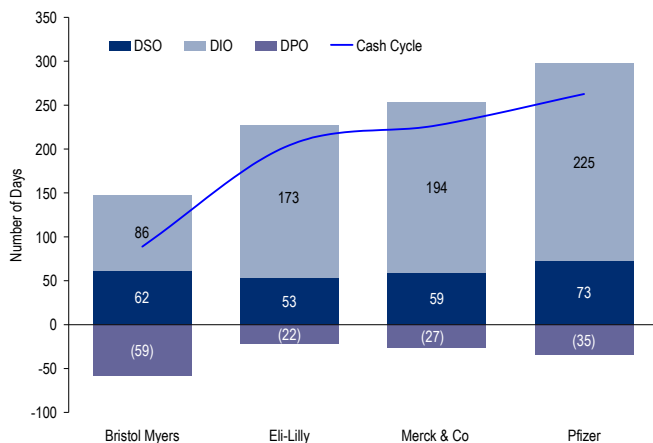
**Odanacatib – a \$2.6bn dollar drug (\$2.2bn risk-adjusted), dependant on safety profile.** We believe that Merck can slowly rebuild its osteoporosis franchise around odanacatib despite intense market pressures. Inexpensive bisphosphonates will likely remain first-line therapy, but we see the potential to create a \$2.2bn franchise. In the US, the emergence of Accountable Care Organisations (ACOs), Patient-Centred Medical Homes (PCMHs) and Fracture Liaison Services (FLS) should drive increased treatment and diagnosis. Merck's promotional investment should help to address the strong current patient anxiety over bisphosphonate safety. Safety remains our key concern, however, following the termination of other cathepsin K inhibitors – Novartis' balicatib and GSK's relacatib – for skin safety concerns. We look forward to hearing further information about the excess respiratory events identified in the recently published phase II data. *Pages 18-22.*

**Manufacturing rationalization and working capital improvements represent additional source of upside.**

**Potential upside from additional restructuring, working capital improvements.** The company's guidance on COGS for an additional \$1bn reduction (announced July 2011) seems conservative given the surfeit of existing sites (80). Separately, we have modeled a significant improvement in Merck's working capital which currently screens very poorly versus the rest of the sector. Merck should conclude a material overhaul of its IT system in late 2013 (estimated cost >\$500m), bringing all Merck and legacy Schering Plough systems onto a single SAP system. Merck's high Days Inventory Outstanding is partly a consequence of risk management during the process of migrating between old and new IT systems. We anticipate a reduction in the current 194 Days Inventory Outstanding to 170 days by 2015, which, along with net improvements in the other elements of working capital, translates into an estimated ~\$2bn being taken out of net working capital by 2015.

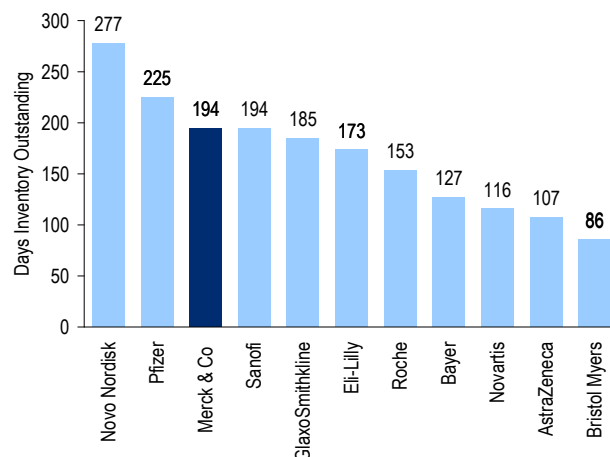


Figure 7. Merck's historical working capital management has been poor...



Source: Citi Research

Figure 8. ... and inventory management in particular has driven this



Source: Citi Research

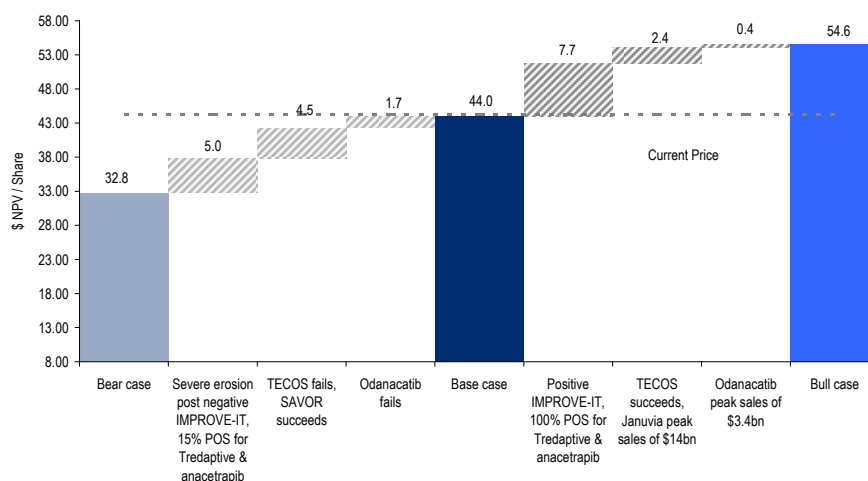
Today, as a companion to our initiation reports on the US companies, we have published what we believe is a landmark analysis of the future challenges and opportunities associated with global market access and reimbursement for the pharmaceutical and healthcare industry, [Pharma: I Pay, You Pay, He Pays, Won't Pay?](#) The continued ability of the industry to monetize its assets is the critical question for investors in the industry, we believe. This state-of-the-art global report assesses how structural and policy changes will impede the industry's ability to monetize their innovations over the next decade, in all major geographies, especially the critical US market where healthcare delivery is set to change radically over the next decade. The report follows previous in-depth reports: [Shrink, Smarten, Spin](#), addressing the impact of the industry's self-help measures to improve R&D productivity, and [the President's Council of Advisors on Science and Technology \(PCAST\) report](#), outlining the drivers for greater risk appetite impacting FDA decision making. Please contact us for further information.

## Valuation

**We set our TP at \$44, 12.2x 2014 non-GAAP EPS. Our Intrinsic Value is \$49.**

Our Target Price of \$44 reflects a 2% discount to the current 12.4x '14 P/E of the US large cap peer group and a 6% premium to the '14 P/E of the global peer group. The discount to the US names is based on Merck's below sector '14-'19 non-GAAP EPS CAGR of 4% (sector at 7%). Our DCF-derived Intrinsic Value is \$49. We project free cash flows for an explicit period of 10 years, and thereafter apply terminal growth assumptions. Consistent with our global sector methodology, which makes use of the CAPM to calculate the cost of equity, we employ a WACC of 8.2% and assume a terminal growth rate of 0%.

Figure 9. Bull-Bear scenarios



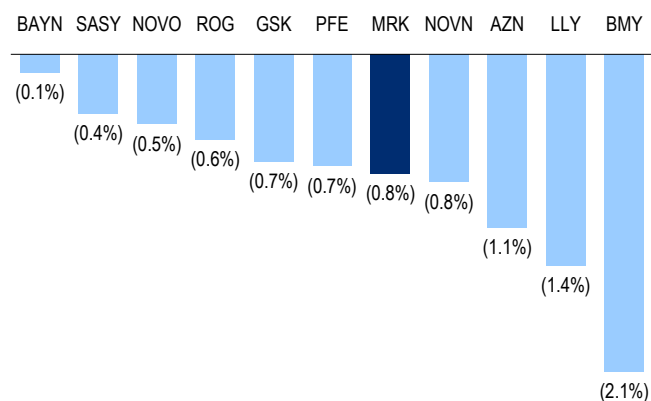
Source: Citi Research

Figure 10. Negative IMPROVE-IT stance underpins our below consensus forecasts

| \$ mns (except per share) | 2012E         | 2013E         | 2014E         | 2015E         | 2016E         |
|---------------------------|---------------|---------------|---------------|---------------|---------------|
| Group Sales               | 47,035        | 44,392        | 43,918        | 43,393        | 44,002        |
| % Growth                  | -2.1%         | -5.6%         | -1.1%         | -1.2%         | 1.4%          |
| <b>Consensus</b>          | <b>47,018</b> | <b>45,844</b> | <b>46,474</b> | <b>47,569</b> | <b>49,069</b> |
| High                      | 47,162        | 47,008        | 48,307        | 49,251        | 50,415        |
| Low                       | 46,885        | 45,042        | 44,077        | 46,064        | 46,887        |
| # Contributors            | 18            | 18            | 15            | 9             | 8             |
| <b>Citi vs. cons</b>      | <b>0.0%</b>   | <b>-3.2%</b>  | <b>-5.5%</b>  | <b>-8.8%</b>  | <b>-10.3%</b> |
| Non-GAAP Operating Profit | 16,111        | 14,983        | 14,514        | 14,227        | 14,473        |
| % Growth                  | -0.6%         | -7.0%         | -3.1%         | -2.0%         | 1.7%          |
| % Margin                  | 34.3%         | 33.8%         | 33.0%         | 32.8%         | 32.9%         |
| +/- bps                   | 54            | (50)          | (70)          | (26)          | 11            |
| Non-GAAP EPS (diluted)    | 3.78          | 3.65          | 3.60          | 3.67          | 3.87          |
| % Growth                  | 0.2%          | -3.4%         | -1.5%         | 1.9%          | 5.6%          |
| <b>Consensus</b>          | <b>3.80</b>   | <b>3.70</b>   | <b>3.89</b>   | <b>4.18</b>   | <b>4.54</b>   |
| High                      | 3.82          | 3.93          | 4.27          | 4.54          | 5.08          |
| Low                       | 3.78          | 3.42          | 3.61          | 3.72          | 3.96          |
| # Contributors            | 19            | 19            | 15            | 9             | 8             |
| <b>Citi vs. cons</b>      | <b>-0.5%</b>  | <b>-1.3%</b>  | <b>-7.5%</b>  | <b>-12.3%</b> | <b>-14.7%</b> |
| DPS                       | 1.68          | 1.68          | 1.68          | 1.68          | 1.68          |
| % Growth                  | 7.7%          | 0.0%          | 0.0%          | 0.0%          | 0.0%          |
| Payout ratio              | 44.4%         | 46.0%         | 46.7%         | 45.8%         | 43.4%         |

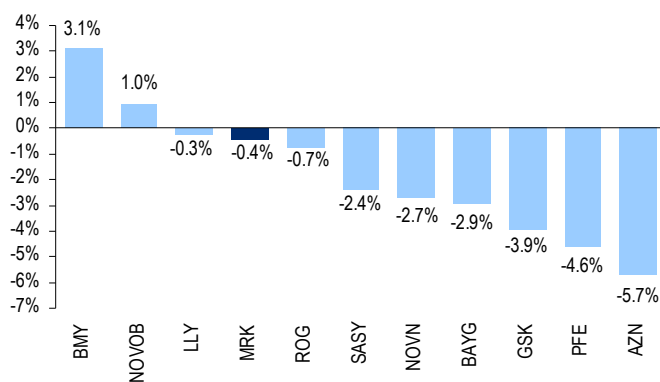
Source: Citi Research, FactSet consensus estimates

**Figure 11. Minimal impact to 2013 non-GAAP EPS from extension of Medicaid rebates to dual eligible Medicare patients**



Source: Citi Research; 2013 non-GAAP/core earnings used in calculation

**Figure 12. Terminal growth rates across the global peer group implied by current market valuations**



Source: Citi Research; implied terminal growth rates are calculated on the basis of Citi estimates

# Risks To Investment Thesis

## Downside Risks

Failures of odanacatib, suvorexant and Tredaptive to be commercialised represent the key downside risks to our thesis.

**Failure of odanacatib (osteoporosis) or suvorexant (insomnia) to be approved.** Two previous members of the cathepsin K inhibitor class have been terminated due to adverse event (AE) issues, particularly dermatological. Odanacatib has shown no morphea related symptoms to date. We note an excess of respiratory symptoms in the phase II trials which raises some concerns over the potential of odanacatib to cause respiratory fibrosis. However, we view this as unlikely.

**“Failure to THRIVE”. Failure of Tredaptive in HPS-THRIVE2** to show a statistically significant benefit compared with placebo. We acknowledge the recent failure of niacin to demonstrate a clinical benefit compared with placebo in the recent negative AIM-HIGH. However, we believe the failure of this trial to demonstrate a clinical benefit in favor of niacin treated patients was due to the intensive LDL lowering through high dose statins during the trial, likely minimizing the impact of niacin.

**Failure of TECOS outcome trial (Januvia)** to demonstrate a cardioprotective effect, despite a cardioprotective effect being visible in the ongoing cardiovascular outcome trials sponsored by AZN/BMY (SAVOR), LLY/BI (CAROLINA) and Takeda (EXAMINE). We believe the downside for Merck in this scenario would likely be limited by our view that proven cardioprotective agents will gain share primarily in the new patient setting.

## Upside Risks

IMPROVE-IT, REVEAL and TECOS success with Vytorin, anacetrapib and Januvia represents the key upside risks to our thesis.

**IMPROVE-IT shows significant benefit for the addition of Vytorin** compared with simvastatin in lowering cardiovascular events. We anticipate a non-GAAP EPS uplift of 4-23% for 2014-17 with an incremental NPV impact of ~\$1.65, or 3% of our Intrinsic Value. The recent data from ENHANCE and ARBITER 6, as well as the long trial duration, makes this an unlikely outcome.

**REVEAL shows anacetrapib lowers cardiovascular risk on top of gold standard** therapy (data not expected until 2015). We note the failure of previous CETP inhibitors dalcetrapib and torcetrapib to show an additional cardiovascular benefit. We anticipate risk-adjusted peak sales of \$800m. Positive data would increase our peak sales estimates to \$5bn per annum (unrisk-adjusted).

**Positive cardiovascular outcome data for Merck's Januvia** in the TECOS trial (anticipated 2014) would likely significantly increase DPP-4 market share ahead of our 14% peak in 2017. We anticipate \$9.8bn of sales in 2020, though our base case assumes no increased uptake as a result of positive CV outcomes data for any of the DPP-4 inhibitors. We note that AZN/BMY's SAVOR trial with Januvia's competitor Onglyza will have final analysis in 2013. Positive data for SAVOR would likely increase Onglyza market share, but would also increase class penetration significantly.

## Pleasure before Pain: CV Franchise?

**Downside risk to near-term consensus estimates.** Our base-case estimates assume global cardiovascular sales decline by 8% annually in '12-'17, from \$6bn to \$3.9bn. We forecast the Zetia/Vytorin franchise to decline by ~30% per annum in '14-'19 following negative results for the IMPROVE-IT trial. We are much more optimistic ahead of the HPS2-THRIVE trial with Tredaptive (data expected in early 2013) compared with the IMPROVE-IT trial with Vytorin (data expected mid 2014) or the REVEAL trial with anacetrapib (interim analyses expected to occur throughout 2015, with final analysis in 2017). Positive data from IMPROVE-IT would increase our franchise sales estimates by up to \$3.7bn over the '14-'17 period (>100% our base case estimates in '16/'17), our non-GAAP EPS estimates by 4-23% over the same period, given the high contribution margin, and our DCF-derived Intrinsic Value by 3% (~\$1.65).

**IMPROVE-IT unlikely to show significant CV benefit for Vytorin vs. simvastatin monotherapy. We forecast franchise erosion from 2014.**

**IMPROVE-IT unlikely to show a significant benefit for Vytorin.** We estimate a decline in sales from \$1.7bn in 2012 to \$1bn in 2016, the year before loss of exclusivity. We anticipate the 75% interim analysis in March 2013, with the final analysis in September 2014. Though we doubt the regulators would seek to remove Vytorin or Zetia from the market, future use of either agent under our base case scenario would likely be restricted to patients with uncontrolled LDL despite optimal statin therapy, or patients unable to tolerate high-dose statin therapy. A significant reduction in cardiovascular events for Vytorin treated patients compared with simvastatin would likely materially increase Vytorin usage as an alternative to Crestor or generic Lipitor.

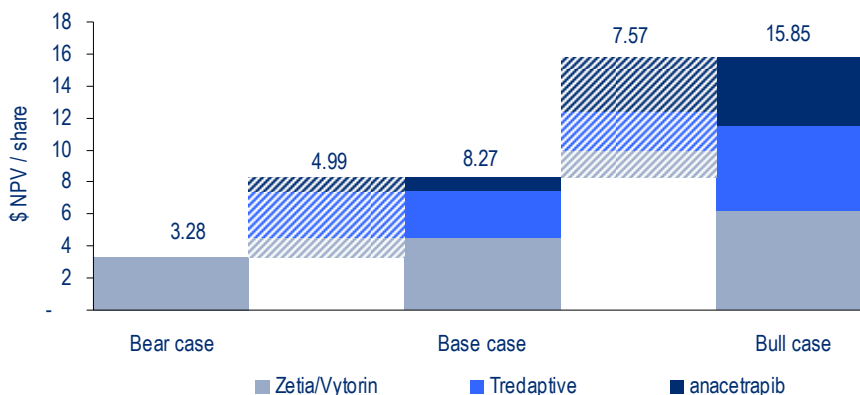
**Negative data from completed ENHANCE and ARBITER-6 trials underpin this view.**

**Our pessimism on IMPROVE-IT is predicated on LDL-C baseline levels in IMPROVE-IT and negative ENHANCE/ARBITER-6 HALTS data.** Despite the fact that Zetia's lack of cardiovascular benefit in ENHANCE and ARBITER-6 can be explained away by citing heavy pre-treatment or short duration/premature trial termination, we are nonetheless concerned over the lack of clinical benefit evident with the addition of ezetimibe (Zetia) to simvastatin. There is little persuasive evidence to suggest that relatively small absolute decreases in LDL (c.10-15mg/dl) on top of an optimized 65g/dl baseline in the control arm of IMPROVE-IT will translate into a meaningful clinical impact. From a biochemical perspective, Zetia monotherapy has been shown to increase the concentration of very low density LDL particles that are correlated with increased cardiovascular risk. However, the clinical relevance of this biochemical effect is unclear given the effect seems to be ameliorated when Zetia is co-administered with statins.

**LDL lowering with Zetia observed in earlier trials, though without CV outcomes benefit.**

The controversial 720-patient ENHANCE trial showed that Vytorin (Zetia plus simvastatin) increased plaque growth (a strong predictive marker of increased cardiovascular risk) compared with patients taking simvastatin monotherapy, despite a significantly greater lowering of LDL-C (58% vs. 41%). Similarly, in the 315-patient ARBITER-6 trial, Niaspan ER demonstrated a statistically significant reduction in CIMT (carotid IMT, a marker for cardiovascular risk), as well as a CV outcomes benefit, vs. Zetia.

Figure 13. CV franchise bull-bear scenarios



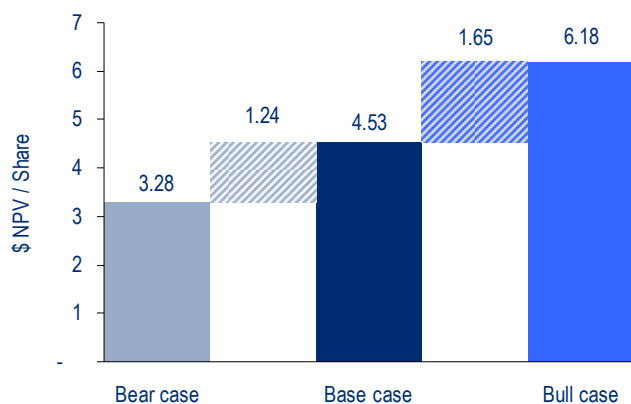
Source: Citi Research

Figure 14. Bear, base and bull scenario assumptions for Merck's cardiovascular franchise

|                         | Bear  | Base   | Bull   |
|-------------------------|---|--|--|
| Vytorin/Zetia Franchise | <ul style="list-style-type: none"> <li>Peak sales of \$4.5bn ('13)</li> <li>Negative IMPROVE-IT</li> <li>Severe franchise decline from '14</li> </ul> | <ul style="list-style-type: none"> <li>Peak sales of \$4.5bn ('13)</li> <li>Negative IMPROVE-IT</li> <li>Franchise decline from '14</li> </ul> | <ul style="list-style-type: none"> <li>Peak sales of \$6.4bn ('16)</li> <li>Positive IMPROVE-IT</li> <li>Franchise decline from '17, with LOE</li> </ul> |
| Tredaptive              | <ul style="list-style-type: none"> <li>Drug not commercialised</li> <li>Drug failure</li> </ul>   | <ul style="list-style-type: none"> <li>Risk-adjusted peak sales of \$3.2bn</li> <li>54% probability of success</li> </ul>                      | <ul style="list-style-type: none"> <li>Peak sales of \$5.9bn</li> <li>100% probability of success</li> </ul>   |
| Anacetrapib             | <ul style="list-style-type: none"> <li>Drug not commercialised</li> <li>Drug failure</li> </ul>   | <ul style="list-style-type: none"> <li>Risk-adjusted peak sales of \$1.1bn</li> <li>20% probability of success</li> </ul>                      | <ul style="list-style-type: none"> <li>Peak sales of \$5.5bn</li> <li>100% probability of success</li> </ul>   |

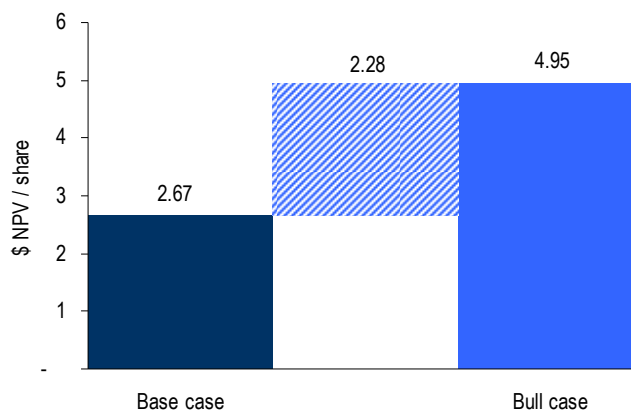
Source: Citi Research

Figure 15. Zetia/Vytorin franchise Bull-Bear scenarios



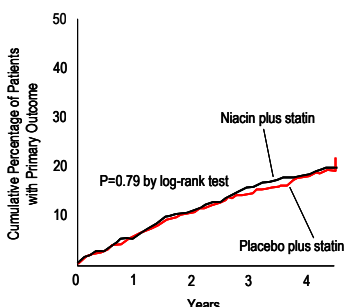
Source: Citi Research

Figure 16. Tredaptive franchise Bull scenario



Source: Citi Research; Bear scenario assumes failure of HPS2-THRIVE and non-commercialisation of Tredaptive

**Figure 17. AIM-HIGH likely failed to show a benefit for Niacin due to low LDL baseline and statistical under-powering**



| No. at Risk         |      |      |      |     |     |
|---------------------|------|------|------|-----|-----|
| Placebo plus Statin | 1696 | 1581 | 1381 | 910 | 436 |
| Niacin plus Statin  | 1718 | 1606 | 1366 | 903 | 428 |

Source: NEJM, Dec 15 2011, Vol.365. No 24, Citi Research

**Conversely, we are optimistic on the outlook for Tredaptive. We forecast \$2.7bn in risk-adjusted peak sales. HPS2-THRIVE data due early 2013.**

**Figure 18. Vytorin/Zetia sales and non-GAAP net income estimates are substantially higher in a scenario where IMPROVE-IT turns out to be positive**

| \$ mlns                     | 2012E       | 2013E       | 2014E        | 2015E        | 2016E         | 2017E         | 2018E        | 2019E        | 2020E        | 2021E        |
|-----------------------------|-------------|-------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|
| Incremental sales           | -           | -           | 915          | 2,582        | 4,003         | 1,888         | 635          | 354          | 232          | 180          |
| Base case sales             | 4,319       | 4,498       | 4,145        | 3,113        | 2,410         | 1,277         | 717          | 564          | 458          | 373          |
| <b>Uplift (%)</b>           | <b>0.0%</b> | <b>0.0%</b> | <b>22.1%</b> | <b>83.0%</b> | <b>166.1%</b> | <b>147.8%</b> | <b>88.5%</b> | <b>62.7%</b> | <b>50.7%</b> | <b>48.2%</b> |
| Incremental net income (NI) | -           | -           | 541          | 1,529        | 2,386         | 1,125         | 381          | 212          | 139          | 108          |
| Base case NI (non-GAAP)     | 11,552      | 10,496      | 10,438       | 10,138       | 10,307        | 10,204        | 10,217       | 10,599       | 11,051       | 11,003       |
| <b>Uplift (%)</b>           | <b>0.0%</b> | <b>0.0%</b> | <b>5.2%</b>  | <b>15.1%</b> | <b>23.1%</b>  | <b>11.0%</b>  | <b>3.7%</b>  | <b>2.0%</b>  | <b>1.3%</b>  | <b>1.0%</b>  |

Source: Citi Research

### Optimistic on the outlook for Tredaptive in the HPS2-THRIVE phase III trial.

We estimate risk-adjusted peak sales of \$2.7bn for Tredaptive. Tredaptive is a combination of niacin and laropiprant (an anti-flushing agent). The 25,673-patient HPS2-THRIVE trial is designed to examine whether Tredaptive lowers cardiovascular risk in high-risk patients compared to current standard of care. We anticipate top-line results from HPS2-THRIVE in early 2013, soon after closure of the study in October 2012. Despite negative results from the recent much smaller AIM-HIGH trial with niacin, we are optimistic that Tredaptive will show a statistically and clinically meaningful outcome benefit on top of existing therapy. We believe Tredaptive's 5-15% LDL lowering from a c.100mg/dl baseline in HPS2-THRIVE, will likely translate into a modest reduction in cardiovascular events, consistent with the benefit seen in positive historical imaging and outcome trials (ARBITER-2/3, HALTS and CLAS). Unlike AIM-HIGH, LDL levels in THRIVE between the Niacin and the control arm were allowed to fluctuate, rather than being kept fixed through statin titration or the addition of Zetia, or both. Given we believe Tredaptive cardioprotective effects are likely LDL, rather than HDL, driven, this should translate into a clinical meaningful reduction of events in the Tredaptive arm.

### Failure of HPS2-THRIVE could, paradoxically, improve near-term EPS outlook.

While we strongly believe in the likelihood of HPS2-THRIVE reporting out positively, we note that a negative outcome for Tredaptive, coupled with a negative outcome for IMPROVE-IT (Vytorin), would allow Merck to make more significant reductions in the primary care and cardiovascular field force, potentially enhancing near-term earnings (although clearly with a negative net impact on intrinsic value).

**Figure 19. Completion of HPS2-THRIVE, IMPROVE-IT, REVEAL frees up R&D budgets. We estimate Merck's phase III CV programme has an aggregate annual cost of ~\$1.1bn.**

| Trial                | No. pts | Completion | Avg annual cost per pt | Annual cost (\$m) | Trial                | 2013          | 2014          | 2015          | 2016          | 2017          |
|----------------------|---------|------------|------------------------|-------------------|----------------------|---------------|---------------|---------------|---------------|---------------|
| HPS2-THRIVE          | 25,673  | Jan-13     | \$15,000               | 385               | HPS2-THRIVE          | 32            | -             | -             | -             | -             |
| IMPROVE-IT           | 18,141  | Sep-14     | \$15,000               | 272               | IMPROVE-IT           | 272           | 204           | -             | -             | -             |
| REVEAL               | 30,000  | Jan-17     | \$15,000               | 450               | REVEAL               | 450           | 450           | 450           | 450           | 38            |
| <b>Total Expense</b> |         |            |                        | <b>1,107</b>      | <b>Total Expense</b> | <b>754</b>    | <b>654</b>    | <b>450</b>    | <b>450</b>    | <b>38</b>     |
|                      |         |            |                        |                   | <b>% Growth</b>      | <b>-31.9%</b> | <b>-40.9%</b> | <b>-59.4%</b> | <b>-59.4%</b> | <b>-96.6%</b> |

Source: www.clinicaltrials.gov, Citi Research

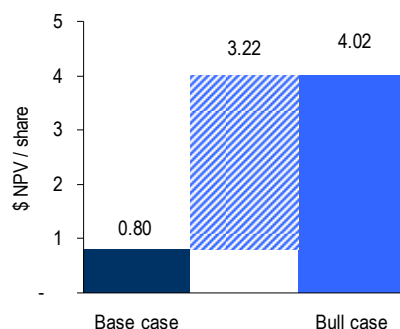
Source: Citi Research

**LDL reduction rather than HDL elevation will be the key to anacetrapib's clinical success. We forecast risk-adjusted peak sales of \$1bn.**

## Anacetrapib: Does It Lower LDL Enough?

**Cautious on anacetrapib.** We are cautious on the pending data from the phase III 30,000-patient REVEAL trial with Merck's CETP inhibitor anacetrapib. We place a 54% risk adjustment on the potential of a positive trial. We anticipate risk-adjusted peak sales of \$1bn. Potential positive data from the REVEAL trial could create very material value for Merck shareholders. REVEAL addresses a much broader target patient population than the recently terminated dal-OUTCOMES trial with Roche's dalcetrapib. In addition, Merck would face minimal incremental distribution costs given its pre-existing cardiovascular sales platform. Final analysis of REVEAL is not expected until 2017, although we assume multiple interim analyses in 2015. For us, the key question is whether the magnitude of LDL lowering induced by anacetrapib's CETP inhibition is sufficient to translate into a significant clinical benefit.

**Figure 21. 100% POS for anacetrapib worth an incremental ~\$3.20/share (7% of IV)**



Source: Citi Research; POS = probability of success; our Base Case assumes a 20% POS.

### **The magnitude of anacetrapib's LDL lowering likely determines whether REVEAL shows a clinical benefit.**

We believe that the potential ability of anacetrapib to lower cardiovascular events depends entirely on genetically and clinically validated LDL lowering, given our previously described skepticism on the importance of HDL elevation (negative results from dalcetrapib in dal-OUTCOMES trial, genetic polymorphism analysis). We believe the probability of early termination for an efficacy benefit at the interim analysis has been lowered following Merck's recent restatement of the anticipated LDL lowering effect of anacetrapib. Merck recently announced that the LDL reduction associated with anacetrapib as seen in the phase II DEFINE study was c.25-35% compared with the 40% previously stated. The lower LDL estimate in anacetrapib treated patients in the phase II DEFINE trial was obtained using a beta quantification to calculate LDL, which Merck believe is a better representation of LDL lowering than data initially presented that was determined using the Friedewald formula. The bias by the Friedewald formula is due to an overestimation of LDL-C. We note that despite the restatement of LDL-C lowering, Merck is unlikely to increase trial target recruitment given the extremely high initial powering.

**Figure 22. In a retrospective analysis, CV events during the treatment phase of the ph2 DEFINE study showed a numerical trend in favour of anacetrapib**

| Event  | Anacetrapib (N=808) | Placebo (N=804)  |  |
|--|---------------------|------------------|--|
|  |                     | number (percent) |  |
| Prespecified, adjudicated CV safety endpoint | 16 (2.0)            | 21 (2.6)         |  |
| Death from CV causes                         | 4 (0.5)             | 1 (0.1)          |  |
| Nonfatal myocardial infarction               | 6 (0.7)             | 9 (1.1)          |  |
| Hospitalization for unstable angina          | 1 (0.1)             | 6 (0.7)          |  |
| Nonfatal stroke                              | 5 (0.6)             | 5 (0.6)          |  |
| Death from any cause                         | 11 (1.4)            | 8 (1.0)          |  |
| Heart failure                                | 3 (0.4)             | 4 (0.5)          |  |
| Revascularization                            | 8 (1.0)             | 28 (3.5)         |  |
| PCI  | 6 (0.7)             | 25 (3.1)         |  |
| CABG   | 2 (0.2)             | 3 (0.4)          |  |

Source: New England Journal of Medicine, Citi Research



Positive indications that REVEAL will work include anacetrapib's greater LDL reduction than other CETP inhibitors, CV trends in DEFINE, and impact on HDL particle numbers.

Doubtful of relevance of HDL elevation to CV outcomes. Recent academic work and failure of other CETP inhibitors support this view.

There are some positive signals that anacetrapib may show a CV benefit in REVEAL.

- Anacetrapib causes much greater LDL lowering than either dalcetrapib or torcetrapib, even using the restated 25-35% LDL lowering seen in DEFINE. This compares with c.15% for torcetrapib and a negligible effect for dalcetrapib.
- We note a numerical trend in cardiovascular events favoring anacetrapib in the phase II DEFINE data set.
- Anacetrapib seems to have a positive impact on the HDL profile and particle numbers which are thought to increase HDL flux. We lack similar profiling from dalcetrapib and torcetrapib for comparison.

**We continue to doubt the relevance of HDL elevation.** The data supporting the importance of HDL elevation in reducing cardiovascular risks continues to deteriorate. We highlight the recent Lancet polymorphism analysis summarized below, which clearly demonstrates that many of the genetic mechanisms responsible for raising plasma HDL cholesterol do not seem to lower risk of myocardial infarction. This observation fits with recent negative phase III trials with potent HDL-elevating CETP agents (ROG's dalcetrapib and PFE's torcetrapib). We note that in contrast, the polymorphism analysis for LDL levels is consistently and significantly associated with lower myocardial infarction event risk.

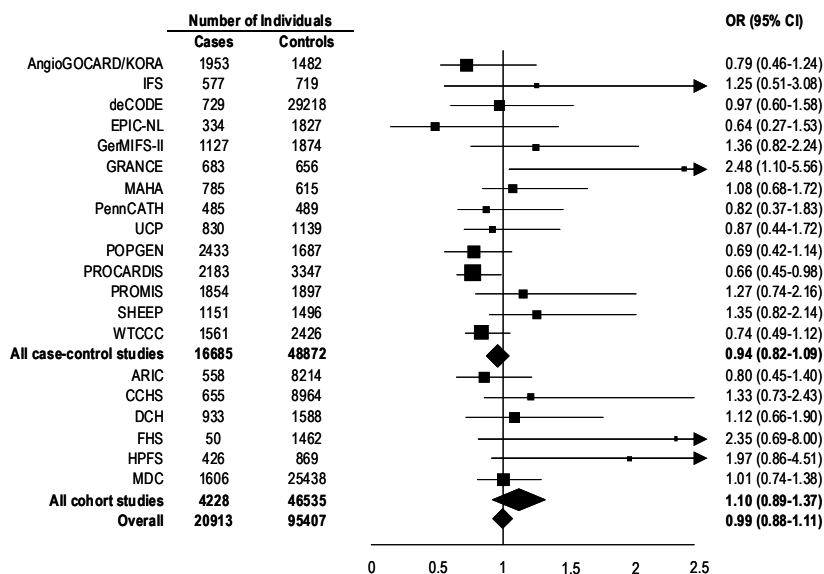
Figure 23. No evidence that genetically raised HDL is cardioprotective, in contrast to low LDL

|                 | Odds Ratio (95%CI) per SD increase in plasma lipid based on observational epidemiology* | Odds Ratio (95% CI) per SD increase in plasma lipid conferred by genetic score ** |
|-----------------|---|---|
| LDL cholesterol | 1.54 (1.45-1.63)  | 2.13 (1.69-2.69), $p=2 \times 10^{-10}$   |
| HDL cholesterol | 0.62 (0.58-0.66)  | 0.93 (0.68-1.26), $p=0.63$  |

\*Observational epidemiology estimates derived from more than 25,000 individuals from prospective cohort studies

\*\*LDL genetic score consisting of 13 single nucleotide polymorphisms (SNPs); HDL genetic score consisting of 14 SNPs as shown in the appendix p 28; Source: Citi Research, the Lancet

Figure 24. Higher isolated HDL due to Endothelial Lipase Polymorphism is not cardioprotective across a cohort of 116,320 participants from 20 studies

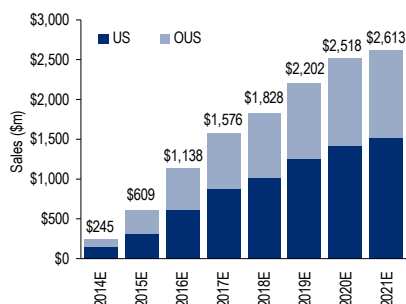


Source: the Lancet, Citi Research

## Odanacatib: Slow Blockbuster

**Rebuild market, differentiate odanacatib.** While odanacatib offers significant long-term commercial potential for fracture in the osteoporotic market, safety concerns need to be addressed. Merck will require significant investment and time to rebuild and re-educate patients and physicians in this significantly contracted market. We anticipate a slow launch with revenue potential being back end loaded as Merck rebuilds the osteoporosis market. We anticipate risk-adjusted sales of \$2.2bn in 2021 (\$2.6bn unrisk-adjusted).

**Figure 25. We estimate an unrisk-adjusted revenue opportunity for odanacatib of \$2.6bn in 2021**



Source: Citi Research

**Ongoing safety follow-up for the early terminated phase III trial may be related to skin/respiratory signals.**

**MRK must address two key challenges in commercialising odanacatib: (i) US market in decline, (ii) high payer hurdles due to availability of generic alternatives.**

**Efficacy of odanacatib clear, but safety concerns remain.** The un-blinded extension of the phase III registration trial remains ongoing, following early termination of the trial due to strong efficacy. While the phase III data is not yet public and long-term safety follow-up continues, the early termination of the phase III trial for efficacy and supportive phase II and BMD (bone mineral density) underpins of our thesis that odanacatib efficacy likely exceeds bisphosphonates. In the phase II data published at the ASMB 2012 conference, we calculate a statistically significant 7% absolute reduction in fracture risk ( $p < 0.01$  using Z score) with odanacatib. Separately, Merck has shown that odanacatib increases BMD beyond 2 years compared to bisphosphonates, whereas BMD reaches a plateau at 3 years.

**We suspect that the phase III data may even show that odanacatib was associated with a significant reduction in hip fractures.** Evidence that odanacatib significantly reduced hip fractures in the phase III trial, as well as vertebral fractures, would likely strongly differentiate the product's efficacy from bisphosphonates in the mind of payers and prescribers. Near term, the current interpretation of FDAMA 114 will limit the ability of Merck to promote any economic benefits to payers, but we would expect this to be resolved over the longer term (see today's companion sector piece, [Pharma: I Pay, You Pay, He Pays, Won't Pay?](#))

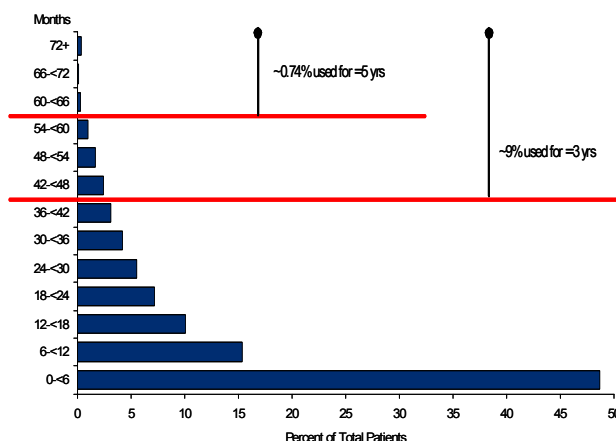
### **Is the ongoing phase III safety follow-up related to skin, respiratory signals?**

The Data Safety Monitoring Board (DSMB), however, highlighted the need for additional information to address potential safety concerns that became evident in the trial. We have been unable to identify these areas of concern. One obvious candidate is concern related to the morphea-like skin reactions seen with the first generation of compounds in the cathepsin K (cat-K) inhibitor class (Novartis' balicatib or GSK's relacatib). Merck has previously argued that odanacatib's greater specificity to cat-K inhibition in bone explains the lack of adverse events with odanacatib. In contrast to balicatib or relacatib, there was no evidence of morphea-like skin reactions associated with the phase II odanacatib data (although there was higher numerical discontinuation rates for skin AEs in the ODN 50mg group). We also note that phase II data identified increased respiratory symptoms as a potential area of concern (4.1% in the ODN 50mg group vs. 0.8% in the placebo group), highlighting the potential risk of odanacatib-related lung fibrosis.

### **Merck has two key challenges to address in commercialising odanacatib:**

1. The continued decline of the addressable osteoporosis market, particularly in the US, due to declining DEXA scan reimbursement and elevated patient anxiety over new therapies
2. High payer hurdles given the availability of inexpensive generic oral bisphosphonates and soon to be generic Reclast (which has the advantage of no copay for most patients)

**Figure 26. ~65% of US patients discontinue bisphosphonates within 12m of initiating therapy (2006-2010)**



Source: 'Osteoporosis Rx: Clinical Decisions Today', Robert A. Adler, MD, McGuire Veterans Affairs Medical Center, Richmond, Virginia Commonwealth University, Citi Research

**Number of DEXA diagnostic scans performed in US has fallen 20% over last 3 years.**

**Patient awareness and anxiety over side effects of oral bisphosphonates have never been higher in US.**

**Wide availability of generic bisphosphonates – oral, and soon IV – poses serious challenge to odanacatib.**

**Three target patient markets for odanacatib: (1) treatment-naïve patients anxious over/intolerant to bisphosphonate use; (2) patients refractory to bisphosphonates; (3) patients non-compliant with bisphosphonates.**

**The number of DEXA scans performed per annum has dropped substantially.**

Medicare reimbursement rates have fallen 20% over the last 3 year from \$135 per test to just \$50 today. Given that each test costs the clinician \$55 in terms of administration cost, BMD testing is currently a loss making activity for the clinician, leading to a significant reduction in sites equipped to perform BMD and diagnose osteoporosis.

**Patient anxiety over the safety of osteoporosis drugs is at record levels in the US,** leading to a high percentage of new scripts being unfilled and a significant rate of discontinuation of therapy within the first year of treatment. The increased anxiety has been fuelled by reported increases in atypical femoral fractures, osteonecrosis of the jaw (ONJ) and oesophageal cancer in bisphosphonates-treated patients. We note the recent withdrawal of intranasal calcitonin in Europe following regulatory concerns related to the observation of a more than threefold increase in cancer in an analysis of all available calcitonin trials (2.4% in patients taking calcitonin-receiving medicines vs. 0.7% in patients taking placebo).

**The challenges to build the odanacatib brand are non trivial.** Bisphosphonates have very significant reduction in fracture risk (c.40%), and cost less than 50 cents per day, given recent genericisations. Looking forward, Novartis' Reclast (an IV bisphosphonate) goes generic in 2013 and will be available to Medicare patients without requiring a copay. PBMs already require Prolia patients to fail bisphosphonates before receiving Prolia. Some PBMs may potentially require patients to fail generic Reclast as well.

Our conversations with clinicians and KOLs engaged in the management of osteoporosis have highlighted the following opportunities for odanacatib to significantly expand the target patient population. We see three target markets for odanacatib:

1. Newly diagnosed patients 'intolerant' or 'anxious' over bisphosphonates use. (At least 20% of patients are classified as intolerant, and only one third of newly diagnosed patients prescribed with bisphosphonates fill their first prescription, presumably at least in part due to anxieties over the consequences of initiating therapy.)

2. Bisphosphonate-medicated patients who have experienced fractures despite a background of bisphosphonate therapy.
3. Formerly medicated bisphosphonate patients who have ceased therapy either as a function of BMD stabilization, bisphosphonate-related anxiety or bisphosphonate intolerance. ~65% of patients who cease bisphosphonate therapy do so during the initial years of treatment. Bisphosphonate-related compliance is very poor, meaning that only 40-50% of patients take their medications on a consistent basis.

**Evolution of US healthcare delivery should help MRK commercialise odanacatib successfully – increasing numbers of clinicians assuming employee status, ACOs, PCMHs, JCA and FLS in particular.**

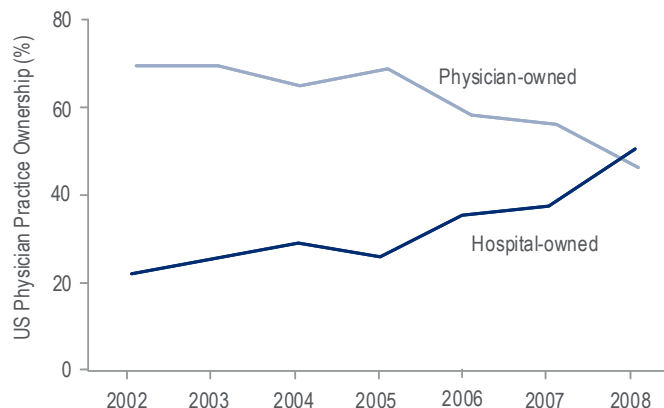
**Evolution of US healthcare delivery may aid Merck.** Despite the payer hurdle, we believe that the future evolution of US healthcare delivery infrastructure will likely aid Merck's attempts to commercialise odanacatib.

- The migration of endocrinologists from independent status to hospital affiliates or employees is likely to increase the diagnosis rate of osteoporosis given the removal of the negative economics of performing DEXA scans as a self-employed clinician.
- The adoption of shared savings plans inside or outside of an Accountable Care Organisation (ACO) may further increase diagnosis and treatment rates dependant on whether osteoporosis management is incorporated into meaningful use criteria.
- The emergence of the PCMH (Patient-Centered Medical Care Home) to co-ordinate primary care should also increase diagnosis and treatment rates dependant on incorporation of osteoporosis into so-called "problem lists", which are flagged on EHR (Electronic Health Records).
- The Joint Commission Accreditation (JCA) for hospitals is pushing for mandatory osteoporosis testing and treatment in all cases of ER admission post fracture.
- Many countries are now funding and deploying Fracture Liaison Services (FLS) that research has shown to significantly improve follow-up assessment and treatment after an initial fracture occurs, thereby reducing the likelihood of additional bone breaks. In US hospitals less than 30% of patients receive osteoporosis treatment at the time of hospital admission for fracture.

**MRK to take proactive measures to increase diagnosis rates and physicians/patient education.**

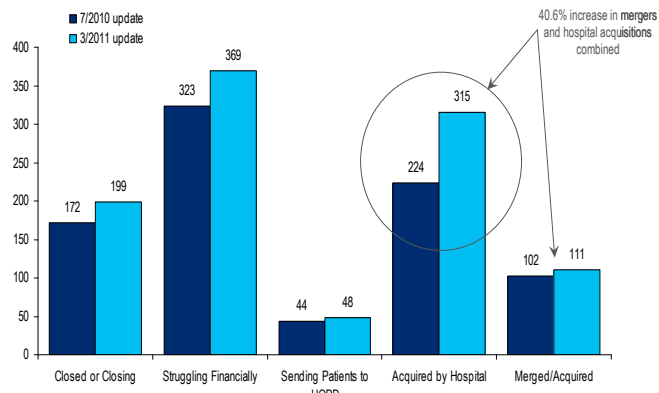
**Merck will invest in both diagnostic infrastructure and education.** We anticipate that Merck will look to heavily subsidize DEXA infrastructure to reverse declining diagnosis rates, as well as invest in physician and patient education over the consequences of untreated osteoporosis. Industry advertising for osteoporosis drugs has obviously collapsed following the genericisation of all oral bisphosphonates. We anticipate a significant increase in patient DTC advertising as Merck attempts to build awareness and differentiate its product from the bisphosphonates in the eyes of patients.

**Figure 27. Migration of physicians to hospital employees likely increases probability of participation in pay-for-performance programs and greater use of DEXA scans to diagnose osteoporosis**



Source: Physician Compensation and Production Survey, Medical Group Association, 2003 -2009, Citi Research

**Figure 28. Migration of community physicians to employee status significant, and set to continue**



Source: American Medical Association, Citi Research

**Upside to our estimates if MRK can successfully position odanacatib as first-line alternative to bisphosphonates.**

**Potential for long-term upside surprise.** We believe that Merck still retains significant institutional knowledge in osteoporosis following the commercial success of Fosamax. Ultimately, Merck may be able to position odanacatib as a first-line agent, despite its doubtless hefty premium price. We note Merck's success in diabetes with Januvia, where it has partly displaced the older and much less expensive sulphonylureas given the perception of improved safety/efficacy. Assuming the adverse event profile of odanacatib does not deteriorate from phase II to phase III, Merck will work hard to increase the percentage of patients deemed to be bisphosphonate intolerant. Given the anticipated higher efficacy and tolerability of odanacatib, we anticipate that Merck will aim to produce real world data that demonstrates both the levels of non-compliance with bisphosphonates, as well as the comparative potential improvements with odanacatib.

**Primary competitive threat to odanacatib comes from bisphosphonates rather than other novel agents.**

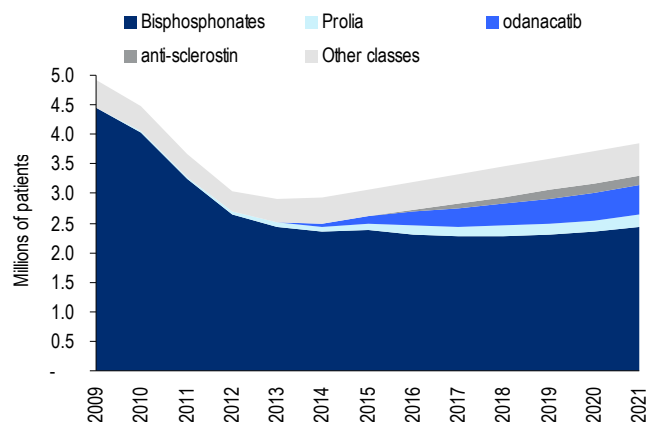
**Generic bisphosphonates, not novel entrants, are the main challenge for odanacatib.** We see sclerostin-focused drugs (UCB/Amgen's AMG-785, Lilly's blosozumab and Novartis' BPS-804) as likely short-duration post fracture interventions rather than chronic therapies. In the branded space, odanacatib's main competition is likely to be Amgen's Prolia. We assume Amgen will seek to persuade clinicians to use sclerostin in the acute setting, followed by maintenance Prolia therapy. Earlier competitors in the osteoporosis market include ONO-5335, which is in early phase II development.

**Our proprietary modeling of the global osteoporosis market assumes 12% peak penetration for odanacatib and unrisk-adjusted peak sales of \$2.6bn.**

**Citi's proprietary market model.** Figure 31 shows a sales summary from our proprietary osteoporosis market model. We assume 2014 launch for odanacatib with relatively slow uptake given reimbursement and pre-existing safety concerns. Assuming odanacatib does not face any emergent safety concerns, we see the structural changes in the US aiding both market expansion and market share gain, as outlined above.

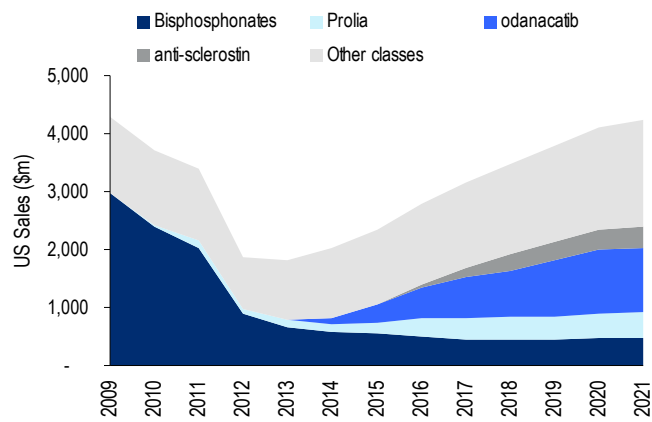
*Our proprietary therapeutic model is available on request.*

Figure 29. Number of patients on bisphosphonates in the US has declined by ~40% since 2009



Source: Citi Research

Figure 30. MRK's legacy expertise in osteoporosis should help it rebuild the US market



Source: Citi Research

Figure 31. Osteoporosis therapeutic model summary

|                                 | 2010A            | 2011A            | 2012E            | 2013E            | 2014E            | 2015E            | 2016E            | 2017E            | 2018E            | 2019E            | 2020E            | 2021E            |
|---------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| <b>Total market demand</b>      | <b>9,433,174</b> | <b>8,617,389</b> | <b>7,980,954</b> | <b>7,829,155</b> | <b>7,847,893</b> | <b>7,971,802</b> | <b>8,097,399</b> | <b>8,224,647</b> | <b>8,353,508</b> | <b>8,483,939</b> | <b>8,615,897</b> | <b>8,749,796</b> |
| US                              | 4,483,869        | 3,673,632        | 3,042,723        | 2,896,429        | 2,920,648        | 3,050,017        | 3,181,053        | 3,313,717        | 3,447,973        | 3,583,777        | 3,721,087        | 3,860,316        |
| OUS                             | 4,949,305        | 4,943,757        | 4,938,231        | 4,932,727        | 4,927,245        | 4,921,785        | 4,916,346        | 4,910,930        | 4,905,535        | 4,900,162        | 4,894,810        | 4,889,480        |
| <b>Total market sales (\$m)</b> | <b>\$6,515</b>   | <b>\$6,253</b>   | <b>\$4,435</b>   | <b>\$4,243</b>   | <b>\$4,617</b>   | <b>\$5,080</b>   | <b>\$5,799</b>   | <b>\$6,496</b>   | <b>\$7,032</b>   | <b>\$7,605</b>   | <b>\$8,114</b>   | <b>\$8,362</b>   |
| US                              | \$3,711          | \$3,401          | \$1,878          | \$1,819          | \$2,082          | \$2,353          | \$2,868          | \$3,355          | \$3,743          | \$4,166          | \$4,524          | \$4,798          |
| OUS                             | \$2,804          | \$2,852          | \$2,557          | \$2,425          | \$2,535          | \$2,726          | \$2,930          | \$3,141          | \$3,290          | \$3,439          | \$3,590          | \$3,564          |
| <b>Bisphosphonates</b>          |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| <b>Total patient demand</b>     | <b>8,613,999</b> | <b>7,765,795</b> | <b>7,027,555</b> | <b>6,769,727</b> | <b>6,585,453</b> | <b>6,451,686</b> | <b>6,186,996</b> | <b>5,974,335</b> | <b>5,895,022</b> | <b>5,811,568</b> | <b>5,761,062</b> | <b>5,845,629</b> |
| US                              | 4,042,712        | 3,257,109        | 2,637,468        | 2,438,793        | 2,362,805        | 2,391,213        | 2,303,082        | 2,266,583        | 2,289,454        | 2,307,953        | 2,359,169        | 2,447,441        |
| OUS                             | 4,571,288        | 4,508,686        | 4,390,087        | 4,330,934        | 4,222,649        | 4,060,472        | 3,883,914        | 3,707,752        | 3,605,568        | 3,503,616        | 3,401,893        | 3,398,188        |
| <b>% marketshare</b>            | <b>91%</b>       | <b>90%</b>       | <b>88%</b>       | <b>86%</b>       | <b>84%</b>       | <b>81%</b>       | <b>76%</b>       | <b>73%</b>       | <b>71%</b>       | <b>69%</b>       | <b>67%</b>       | <b>67%</b>       |
| US                              | 90%              | 89%              | 87%              | 84%              | 81%              | 78%              | 72%              | 68%              | 66%              | 64%              | 63%              | 63%              |
| OUS                             | 92%              | 91%              | 89%              | 88%              | 86%              | 83%              | 79%              | 76%              | 74%              | 72%              | 70%              | 70%              |
| <b>Total sales (\$m)</b>        | <b>\$4,453</b>   | <b>\$3,866</b>   | <b>\$2,321</b>   | <b>\$1,875</b>   | <b>\$1,687</b>   | <b>\$1,544</b>   | <b>\$1,351</b>   | <b>\$1,204</b>   | <b>\$1,162</b>   | <b>\$1,121</b>   | <b>\$1,087</b>   | <b>\$1,079</b>   |
| US                              | \$2,405          | \$2,023          | \$891            | \$656            | \$582            | \$562            | \$488            | \$453            | \$456            | \$458            | \$466            | \$482            |
| OUS                             | \$2,048          | \$1,843          | \$1,429          | \$1,219          | \$1,105          | \$982            | \$863            | \$751            | \$706            | \$663            | \$621            | \$598            |
| <b>Odanacatib</b>               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| <b>Total patient demand</b>     |                  |                  |                  |                  | <b>107,685</b>   | <b>269,654</b>   | <b>494,518</b>   | <b>671,704</b>   | <b>766,744</b>   | <b>907,819</b>   | <b>1,025,105</b> | <b>1,042,257</b> |
| US                              |                  |                  |                  |                  | 58,413           | 122,001          | 229,036          | 318,117          | 362,037          | 430,053          | 474,439          | 492,190          |
| OUS                             |                  |                  |                  |                  | 49,272           | 147,654          | 265,483          | 353,587          | 404,707          | 477,766          | 550,666          | 550,066          |
| <b>% marketshare</b>            |                  |                  |                  |                  | <b>1%</b>        | <b>3%</b>        | <b>6%</b>        | <b>8%</b>        | <b>9%</b>        | <b>11%</b>       | <b>12%</b>       | <b>12%</b>       |
| US                              |                  |                  |                  |                  | 2%               | 4%               | 7%               | 10%              | 11%              | 12%              | 13%              | 13%              |
| OUS                             |                  |                  |                  |                  | 1%               | 3%               | 5%               | 7%               | 8%               | 10%              | 11%              | 11%              |
| <b>Total sales (\$m)</b>        |                  |                  |                  |                  | <b>\$245</b>     | <b>\$609</b>     | <b>\$1,138</b>   | <b>\$1,576</b>   | <b>\$1,828</b>   | <b>\$2,202</b>   | <b>\$2,518</b>   | <b>\$2,613</b>   |
| US                              |                  |                  |                  |                  | \$146            | \$314            | \$607            | \$869            | \$1,019          | \$1,246          | \$1,416          | \$1,513          |
| OUS                             |                  |                  |                  |                  | \$99             | \$295            | \$531            | \$707            | \$809            | \$956            | \$1,101          | \$1,100          |

Source: Citi Research, Company data

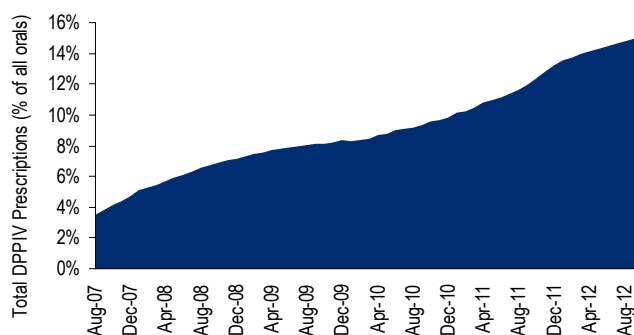
## Merck's Januvia Franchise on the Way to \$9.8bn Per Annum

We continue to see long-term potential upside to the Januvia franchise given the supportive demographics in both Western Europe and Emerging Markets, coupled with the potential uplift from positive data in any of the ongoing cardiovascular outcome trials that are underway with the DPP-4 class (listed below). We place a 60% conditional probability that the BMJ/AZN's SAVOR trial with Onglyza will demonstrate a reduction in cardiovascular events; a 50% interim efficacy analysis is due before year end and the trial will report final data in H2 2013. Merck's TECOS cardiovascular outcomes trial with Januvia is scheduled to complete by year end 2014. We assume there is also an interim analysis planned.

Our base case assumes that DPP-4s will take increasing share of the global OAD market from older generic agents metformin/SUs.

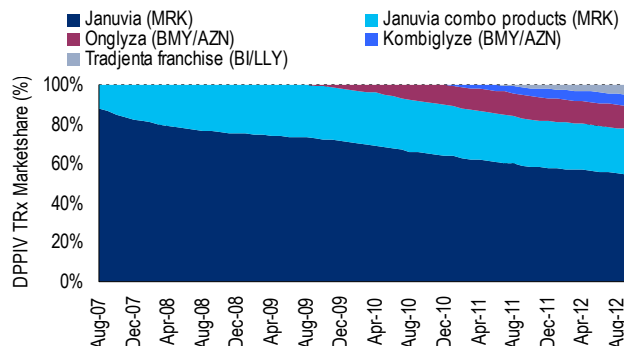
Our base case assumes that DPP-4 market share in the US will rise from 8%, as it is currently, to 14% by 2017. Within this class, we anticipate Merck to achieve a stable 65% market share by 2019, despite the increased competitive pressures from other DPP-4 agents. We note that currently ~90% of the US market still relies on metformin and sulphonylureas (SUs) and ~95% in developed markets outside the US. Our model reflects these shares declining to ~75% and ~85% in the respective geographies, driven by the increased and earlier usage of DPP-4s.

Figure 32. DPP-4s now represent 15% of the oral market by TRx



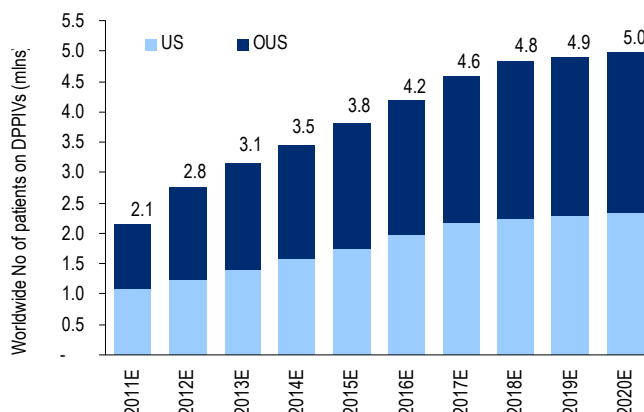
Source: Citi Research

Figure 33. Januvia/Janumet represents c.80% of DPP-4 market by TRx



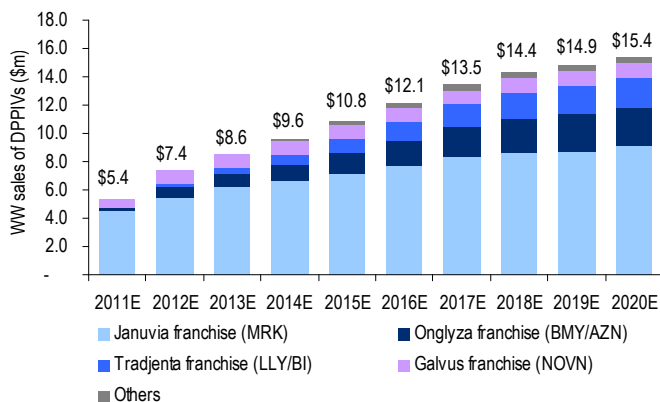
Source: Citi Research

Figure 34. No. of patients WW taking DPP-4s to reach >5m by 2017



Source: Citi Research; estimates are for developed markets and do not include EM

Figure 35. Global DPP-4 market to be worth ~\$18bn by 2020E, MRK's Januvia franchise alone representing ~\$9bn



Source: Citi Research; estimates are for developed markets and do not include EM



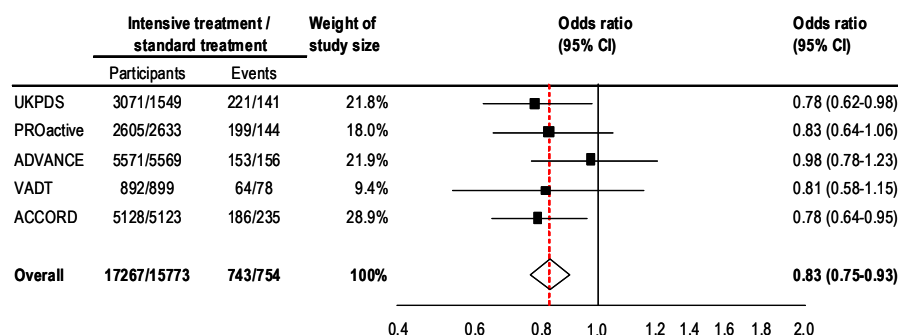
LLY/BI CAROLINA trial with Tradjenta most likely of all DPP-4 outcome trials to show CV benefit, given SU comparator. We expect data in 2014.

DPP-4 and GLP-1 meta-analysis supportive of potential CV benefit.

**Lowered cardiovascular risk for BMY/AZN's Onglyza in SAVOR trial should benefit the entire DPP-4 inhibitor class.** We anticipate BMY/AZN's SAVOR cardiovascular outcomes trial with Onglyza to be the first DPP-4 inhibitor outcomes trial to report data in H213. We view positive cardiovascular outcomes data for any of the ongoing CV trials to increase utilization rates for the whole class rather than exert a drug specific impact. We place a conditional probability of 50-60% on SAVOR or TECOS showing a significant lowering of cardiovascular events, given supportive meta-analysis. We place a higher conditional probability of 80% on LLY/BI's CAROLINA outcomes trial showing a CV benefit given the head-to-head design against the sulphonylurea Amaryl. Sulphonylureas are thought to have an increased cardiovascular risk. We anticipate LLY/BI's CAROLINA to report out in 2014. For further details, please see today's companion report on the global diabetes market, [Global Pharma: The Sweet Spot](#).

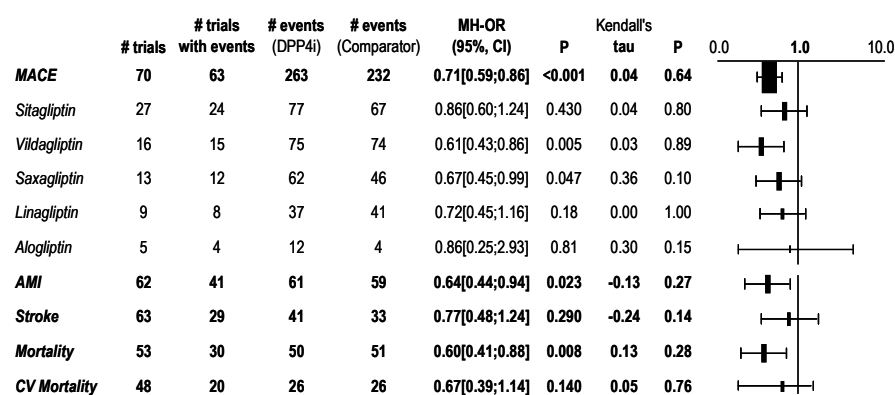
**Meta-analysis of cardiovascular outcomes data from the DPP-4 and GLP-1 class is supportive of a potential treatment benefit.** There are design differences between the MRK and BMY/AZN trials, most notably the fact that MRK's TECOS trial includes a softer cardiovascular endpoint within its composite primary endpoint – hospitalization for unstable angina (UA) (see Figure 39 for a full list of ongoing CV outcomes trials).

Figure 36. Intensive glucose lowering linked to lower event rates for non-fatal myocardial infarction compared with standard treatment



Source: Lancet 2009, 373: 1765–72, Citi Research

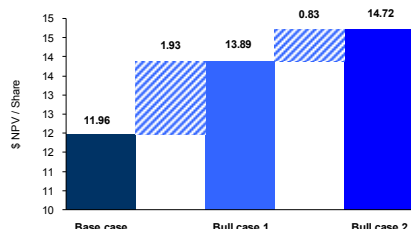
Figure 37. Mantel-Haenzel Odds Ratio (MH-PR) for major cardiovascular events (MACE), acute myocardial infarction (AMI), stroke, mortality and cardiovascular (CV) mortality with 95% CI. DPP4i, dipeptidyl peptidase-4 inhibitors



Source: Diabetes, Obesity and Metabolism, 2012, Citi Research



**Figure 38. Positive CV outcomes data for DPP-4 inhibitor class/Januvia alone worth ~\$1.90-\$2.80 / share**



Source: Citi Research; see note to Figure 6 for Bull case 1/2 assumptions.

**MK-3102, MRK's once weekly DPP-4, could accelerate market share gains for Januvia franchise.**

**Though we see role for other members of class, we nevertheless model ~60% share of developed market patients.**

**The commercial impact of a positive TECOS, SAVOR or CAROLINA trial will depend on driver, subgroup and magnitude of benefit demonstrated.** In the event that the primary endpoint of SAVOR shows a c.20% relative risk reduction, we anticipate that DPP-4 use would significantly expand across all geographies to join metformin as the standard of care. Furthermore, we anticipate that DPP-4 inhibitors would likely move up the treatment algorithm to join metformin as an alternative or part of a combination product (such as Janumet or Kombiglyze) for first-line use. DPP-4 prescriptions reflect c.8% of total oral prescriptions in the US today, compared with metformin, which accounts for c.45%. Assuming the DPP-4 category current price of ~\$2,800 per annum grows 3-4% per annum in the US, a positive CV effect for the class could potentially lead to a 50% expansion in the pool of patients on DPP-4s – an opportunity worth potentially \$7bn, we believe. If we assume Januvia/Janumet captures 30% of this incremental opportunity, this represents peak sales of \$11.3bn, or \$14/share (incremental \$2 on base case; see Figure 38). A scenario in which only TECOS shows a CV benefit and the other outcome trials fail would lead to incremental upside of an estimated \$900m or \$0.80/share.

**Merck's once weekly DPP-4 inhibitor (MK-3102) could accelerate DPP-4 market share gains** by offering a more convenient option alternative to metformin initial therapy. A convenient, well-tolerated once weekly DPP-4 inhibitor could be an attractive metformin in newly diagnosed diabetics, particularly among younger unmedicated patients willing to cover the co-pay. Merck recently indicated that it has initiated phase III programmes with MK-3102 25mg once weekly. We anticipate risk-adjusted peak sales of \$1.1bn.

**Intensified competition, but Merck likely to remain dominant participant.** While more recently approved DPP-4 will likely attempt to use rebating to win contracts with PBM, we believe that Januvia's dominant position with prescribers and rich primary care pipeline will make PBMs thoughtful about renegotiating solely on price. In terms of potentially disruptive events to this dynamic, we have highlighted the CAROLINA trial with LLY/BI's Tradjenta, which may deliver a superior profile. In addition, we anticipate that Takeda is likely to partner with either PFE or GSK, becoming a greater competitive risk as a result. We highlight today's initiation report on Eli Lilly, [It's not about Solanezumab. Buy.](#)

Figure 39. Ongoing outcome trials for DPP-4s and GLP-1s

| Drug         | Study         | Primary Completion | N      | Comparator        | Treatment arms                | Primary Endpoint(s)   | Secondary Endpoint(s)  |
|--------------|---------------|--------------------|--------|-------------------|-------------------------------|---|--|
| <b>DPP-4</b> |               |                    |        |                   |                               |   |  |
| Januvia      | TECOS         | Dec-14             | 14,000 | Pbo + ADs         | Januvia 50/100mg QD; pbo      | Time to first CV event (composite endpoint CV death, non-fatal MI/ischaemic stroke, hospitalisation for UA) | <ul style="list-style-type: none"> <li>• Time to first CV event</li> <li>• Time to all-cause mortality</li> <li>• Time to congestive heart failure</li> <li>• Change in renal function over time</li> </ul>  |
| Onglyza      | SAVOR-TIMI 53 | Jul-13             | 16,500 | Pbo + ADs         | Onglyza 2.5mg/5mg QD; pbo     | Time to first CV event (composite endpoint CV death, non-fatal MI/ischaemic stroke)                         | <ul style="list-style-type: none"> <li>• Time to first CV event</li> <li>• Any documented death</li> </ul>   |
| Tradjenta    | CAROLINA      | Sep-18             | 6,000  | glimepiride + ADs | Tradjenta 5mg QD; pbo         | Time to first CV event (composite endpoint CV death, non-fatal MI/ischaemic stroke, hospitalisation for UA) | <ul style="list-style-type: none"> <li>• % pts w/o hypoglycemia/ &gt;2% weight gain, need for rescue medication at final visit</li> <li>• % pts w/o &gt;2% weight gain, need for rescue med at final visit</li> </ul>  |
| Nesina       | EXAMINE       | May-15             | 5,400  | Pbo + ADs         | Nesina 6.25/12.5/25mg QD; pbo | Time to first CV event (composite endpoint CV death, non-fatal MI/stroke)                                   | <ul style="list-style-type: none"> <li>• Time to first CV event</li> <li>• (composite endpoint CV death, non-fatal MI/ stroke, revascularization due to UA)</li> </ul>   |
| <b>GLP-1</b> |               |                    |        |                   |                               |   |  |
| Lyxumia      | ELIXA         | May-14             | 6,000  | Pbo               | Victoza 1.8mg SC OD; pbo      | Time to first CV event (composite endpoint CV death, non-fatal MI/stroke)                                   | <ul style="list-style-type: none"> <li>• Time to first CV event (composite endpoint CV death, non-fatal MI/ stroke, revascularisation, UA, hospitalisation for CHF)</li> <li>• Time to first CV event components of composite</li> </ul>   |
| Victoza      | LEADER        | Jan-16             | 9,341  | Pbo               | Victoza 1.8mg SC OD; pbo      | Time to first CV event (composite endpoint CV death, non-fatal MI/stroke)                                   | <ul style="list-style-type: none"> <li>• Time to first CV event (composite endpoint CV death, non-fatal MI/ stroke, revascularisation, UA, hospitalisation for CHF)</li> <li>• Time to all-cause mortality</li> <li>• Time to first CV event components of composite</li> </ul>  |
| Bydureon     | EXSCEL        | Mar-17             | 9,500  | Pbo               | Bydureon 2mg SC QW            | Time to first CV event (composite endpoint CV death, non-fatal MI/stroke, hospitalisation for UA)           | <ul style="list-style-type: none"> <li>• Time to first CV event components of composite</li> <li>• Time to all-cause mortality</li> <li>• Time to hospitalisation for ACS</li> <li>• Time to hospitalisation for heart failure</li> </ul>  |
| dulaglutide  | REWIND        | Apr-19             | 9,622  | Pbo               | dluaglutide 1.5mg SC QW       | Time to first CV event (composite endpoint CV death, non-fatal MI/stroke)                                   | <ul style="list-style-type: none"> <li>• Time to first CV event components of composite</li> <li>• Time to all-cause mortality</li> <li>• Time to composite microvascular event (retinopathy, proteinuria, 30% fall in GFR or start dialysis)</li> <li>• Time to hospitalisation for heart failure</li> <li>• Time to hospitalisation for unstable angina</li> </ul> |

ADs = antidiabetics

Source: www.clinicaltrials.gov; Citi Research

Figure 40. We see the DPP-4 inhibitor market in the US and developed ex-US increasing from \$5.4bn to \$15.4bn through 2020

| (\$m)                       | 2011A        | 2012E        | 2013E        | 2014E        | 2015E         | 2016E         | 2017E         | 2018E         | 2019E         | 2020E         |
|-----------------------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>Total DPP-4 Market</b>   | <b>5,356</b> | <b>7,352</b> | <b>8,551</b> | <b>9,587</b> | <b>10,811</b> | <b>12,133</b> | <b>13,487</b> | <b>14,362</b> | <b>14,860</b> | <b>15,382</b> |
| US                          | 2,705        | 3,575        | 4,197        | 4,881        | 5,678         | 6,574         | 7,493         | 7,925         | 8,376         | 8,852         |
| OUS (Developed)             | 2,651        | 3,777        | 4,354        | 4,705        | 5,133         | 5,559         | 5,994         | 6,437         | 6,483         | 6,530         |
| <b>Januvia</b>              | <b>3,201</b> | <b>3,846</b> | <b>4,275</b> | <b>4,505</b> | <b>4,748</b>  | <b>4,953</b>  | <b>5,292</b>  | <b>5,381</b>  | <b>5,460</b>  | <b>5,669</b>  |
| US                          | 1,824        | 2,092        | 2,360        | 2,552        | 2,770         | 2,978         | 3,281         | 3,352         | 3,416         | 3,610         |
| OUS (Developed)             | 1,377        | 1,755        | 1,915        | 1,953        | 1,978         | 1,976         | 2,011         | 2,029         | 2,044         | 2,058         |
| <b>Janumet</b>              | <b>1,311</b> | <b>1,677</b> | <b>1,911</b> | <b>2,107</b> | <b>2,388</b>  | <b>2,694</b>  | <b>3,006</b>  | <b>3,200</b>  | <b>3,321</b>  | <b>3,446</b>  |
| US                          | 713          | 870          | 1,022        | 1,191        | 1,387         | 1,608         | 1,834         | 1,941         | 2,053         | 2,170         |
| OUS (Developed)             | 598          | 807          | 889          | 916          | 1,001         | 1,086         | 1,172         | 1,259         | 1,268         | 1,277         |
| <b>Januvia / Janumet</b>    | <b>4,512</b> | <b>5,523</b> | <b>6,187</b> | <b>6,612</b> | <b>7,136</b>  | <b>7,648</b>  | <b>8,298</b>  | <b>8,581</b>  | <b>8,781</b>  | <b>9,115</b>  |
| US                          | 2,537        | 2,961        | 3,383        | 3,743        | 4,157         | 4,586         | 5,116         | 5,293         | 5,469         | 5,780         |
| OUS (Developed)             | 1,975        | 2,562        | 2,804        | 2,869        | 2,979         | 3,062         | 3,182         | 3,288         | 3,311         | 3,335         |
| <b>Onglyza</b>              | <b>211</b>   | <b>532</b>   | <b>645</b>   | <b>781</b>   | <b>941</b>    | <b>1,121</b>  | <b>1,311</b>  | <b>1,462</b>  | <b>1,513</b>  | <b>1,567</b>  |
| US                          | 156          | 398          | 447          | 495          | 577           | 669           | 763           | 808           | 854           | 903           |
| OUS (Developed)             | 55           | 134          | 198          | 286          | 364           | 452           | 548           | 655           | 659           | 664           |
| <b>Kombiglyze</b>           | <b>-</b>     | <b>185</b>   | <b>291</b>   | <b>398</b>   | <b>528</b>    | <b>680</b>    | <b>850</b>    | <b>1,008</b>  | <b>1,082</b>  | <b>1,118</b>  |
| US                          | -            | 111          | 164          | 214          | 277           | 354           | 440           | 505           | 575           | 607           |
| OUS (Developed)             | -            | 73           | 127          | 183          | 250           | 326           | 410           | 503           | 507           | 511           |
| <b>Onglyza / Kombiglyze</b> | <b>211</b>   | <b>716</b>   | <b>935</b>   | <b>1,179</b> | <b>1,469</b>  | <b>1,800</b>  | <b>2,162</b>  | <b>2,470</b>  | <b>2,595</b>  | <b>2,685</b>  |
| US                          | 156          | 509          | 610          | 710          | 855           | 1,023         | 1,203         | 1,312         | 1,429         | 1,510         |
| OUS (Developed)             | 55           | 207          | 325          | 469          | 615           | 777           | 958           | 1,158         | 1,166         | 1,175         |
| <b>Tradjenta</b>            | <b>16</b>    | <b>159</b>   | <b>416</b>   | <b>702</b>   | <b>1,005</b>  | <b>1,369</b>  | <b>1,657</b>  | <b>1,842</b>  | <b>1,992</b>  | <b>2,068</b>  |
| US                          | 12           | 104          | 204          | 381          | 555           | 772           | 954           | 1,087         | 1,232         | 1,302         |
| OUS (Developed)             | 4            | 55           | 212          | 321          | 450           | 597           | 703           | 755           | 761           | 766           |
| <b>Galvus</b>               | <b>617</b>   | <b>954</b>   | <b>1,013</b> | <b>1,000</b> | <b>989</b>    | <b>960</b>    | <b>975</b>    | <b>1,047</b>  | <b>1,055</b>  | <b>1,062</b>  |
| US                          | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| OUS (Developed)             | 617          | 954          | 1,013        | 1,000        | 989           | 960           | 975           | 1,047         | 1,055         | 1,062         |

Extensive therapeutic model, incorporating all segments of the diabetes market, available on request; NB, the OUS developed estimates do not include EM; for Januvia, we estimate this portion of the franchise separately, using disclosed sales figures.

Source: Company data, Citi Research

## Financials

Figure 41. Merck & Co. Annual Sales Model

| \$ mlns                                      | 2011A        | 2012E        | 2013E        | 2014E        | 2015E        | 2016E        | 2017E        | 2018E        | 2019E        | 2020E        | 2021E        |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Product sales</b>                         |              |              |              |              |              |              |              |              |              |              |              |
| <b>Primary Care &amp; Women's Health</b>     |              |              |              |              |              |              |              |              |              |              |              |
| Zetia  | 2,428        | 2,575        | 2,795        | 2,707        | 2,166        | 1,733        | 778          | 414          | 321          | 264          | 218          |
| Vytorin                                      | 1,883        | 1,744        | 1,703        | 1,630        | 1,237        | 1,005        | 634          | 372          | 296          | 238          | 191          |
| <b>Cardiovascular</b>                        | <b>4,311</b> | <b>4,319</b> | <b>4,498</b> | <b>4,337</b> | <b>3,403</b> | <b>2,737</b> | <b>1,412</b> | <b>786</b>   | <b>617</b>   | <b>502</b>   | <b>409</b>   |
| Januvia/Janumet                              | 4,687        | 5,692        | 6,486        | 6,971        | 7,531        | 8,082        | 8,776        | 9,106        | 9,358        | 9,751        | 9,343        |
| <b>Diabetes &amp; Obesity</b>                | <b>4,687</b> | <b>5,692</b> | <b>6,486</b> | <b>6,971</b> | <b>7,531</b> | <b>8,082</b> | <b>8,776</b> | <b>9,106</b> | <b>9,358</b> | <b>9,751</b> | <b>9,343</b> |
| Singular                                     | 5,479        | 3,835        | 915          | 516          | 437          | 375          | 271          | 222          | 183          | 159          | 139          |
| Nasonex                                      | 1,285        | 1,282        | 1,313        | 1,348        | 842          | 733          | 722          | 150          | 104          | 91           | 80           |
| Clarinox                                     | 621          | 393          | 222          | 162          | 130          | 104          | 83           | 66           | 53           | 42           | 34           |
| Asmanex                                      | 206          | 199          | 199          | 196          | 175          | 77           | 43           | 35           | 28           | 23           | 19           |
| Dulera                                       | 96           | 178          | 187          | 196          | 205          | 215          | 225          | 236          | 248          | 260          | 273          |
| Proventil                                    | 155          | 116          | 94           | 76           | 62           | 51           | 42           | 35           | 29           | 24           | 21           |
| <b>Respiratory</b>                           | <b>7,842</b> | <b>6,003</b> | <b>2,930</b> | <b>2,493</b> | <b>1,851</b> | <b>1,555</b> | <b>1,386</b> | <b>744</b>   | <b>645</b>   | <b>600</b>   | <b>565</b>   |
| Fosamax                                      | 856          | 674          | 595          | 537          | 484          | 437          | 395          | 357          | 322          | 291          | 263          |
| NuvaRing                                     | 623          | 632          | 667          | 697          | 721          | 747          | 774          | 484          | 276          | 234          | 199          |
| Follistim AQ                                 | 531          | 467          | 421          | 383          | 353          | 365          | 346          | 350          | 332          | 315          | 300          |
| Implanon                                     | 293          | 339          | 374          | 413          | 448          | 486          | 527          | 572          | 620          | 673          | 730          |
| Cerazette                                    | 268          | 277          | 303          | 325          | 347          | 365          | 383          | 402          | 422          | 443          | 465          |
| <b>Women's Health &amp; Endocrine</b>        | <b>2,571</b> | <b>2,390</b> | <b>2,361</b> | <b>2,354</b> | <b>2,354</b> | <b>2,400</b> | <b>2,425</b> | <b>2,164</b> | <b>1,972</b> | <b>1,957</b> | <b>1,958</b> |
| Maxalt                                       | 638          | 655          | 195          | 136          | 97           | 70           | 52           | 39           | 30           | 23           | 18           |
| Arcoxia                                      | 432          | 447          | 454          | 464          | 473          | 482          | 241          | 169          | 135          | 108          | 86           |
| Avelox                                       | 322          | 224          | 182          | 82           | 56           | 48           | 41           | 36           | 32           | 29           | 26           |
| <b>Other Primary Care and Women's Health</b> | <b>1,392</b> | <b>1,325</b> | <b>831</b>   | <b>682</b>   | <b>625</b>   | <b>600</b>   | <b>334</b>   | <b>244</b>   | <b>197</b>   | <b>160</b>   | <b>130</b>   |
| <b>Hospital &amp; Specialty</b>              |              |              |              |              |              |              |              |              |              |              |              |
| Remicade                                     | 2,667        | 1,998        | 1,952        | 1,952        | 1,855        | 1,762        | 1,639        | 1,475        | 1,327        | 1,194        | 1,075        |
| Simponi                                      | 264          | 304          | 349          | 401          | 441          | 485          | 534          | 587          | 646          | 710          | 781          |
| <b>Immunology</b>                            | <b>2,931</b> | <b>2,302</b> | <b>2,301</b> | <b>2,353</b> | <b>2,296</b> | <b>2,247</b> | <b>2,172</b> | <b>2,062</b> | <b>1,973</b> | <b>1,905</b> | <b>1,856</b> |
| Isentress                                    | 1,360        | 1,572        | 1,732        | 1,597        | 1,459        | 1,290        | 1,127        | 985          | 862          | 755          | 662          |
| PegIntron                                    | 658          | 682          | 680          | 676          | 567          | 400          | 287          | 195          | 178          | 163          | 149          |
| Cancidas                                     | 639          | 639          | 661          | 687          | 718          | 647          | 456          | 390          | 334          | 286          | 245          |
| Victrelis                                    | 118          | 543          | 764          | 918          | 963          | 642          | 429          | 344          | 270          | 213          | 167          |
| Invanz                                       | 406          | 448          | 374          | 291          | 290          | 284          | 227          | 182          | 154          | 137          | 122          |
| Primaxin                                     | 514          | 391          | 326          | 277          | 235          | 199          | 169          | 143          | 122          | 103          | 88           |
| Noxafil                                      | 231          | 251          | 259          | 263          | 267          | 271          | 275          | 279          | 174          | 122          | 99           |
| Crixivan / Stocrin                           | 192          | 160          | 152          | 144          | 137          | 124          | 112          | 102          | 92           | 83           | 75           |
| Rebetol                                      | 175          | 146          | 131          | 118          | 106          | 95           | 86           | 77           | 70           | 63           | 56           |
| <b>Infectious Disease</b>                    | <b>4,293</b> | <b>4,831</b> | <b>5,079</b> | <b>4,972</b> | <b>4,743</b> | <b>3,951</b> | <b>3,168</b> | <b>2,696</b> | <b>2,255</b> | <b>1,924</b> | <b>1,664</b> |
| Temodar                                      | 935          | 908          | 755          | 494          | 454          | 359          | 284          | 225          | 179          | 142          | 113          |
| Emend  | 419          | 492          | 530          | 513          | 361          | 353          | 343          | 316          | 221          | 185          | 156          |
| Intron A                                     | 195          | 193          | 183          | 173          | 164          | 138          | 117          | 99           | 85           | 72           | 62           |
| Caelyx                                       | -            | -            | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>Oncology</b>                              | <b>1,549</b> | <b>1,594</b> | <b>1,468</b> | <b>1,180</b> | <b>980</b>   | <b>850</b>   | <b>744</b>   | <b>641</b>   | <b>485</b>   | <b>400</b>   | <b>331</b>   |
| Cosopt / Trusopt                             | 479          | 432          | 378          | 341          | 307          | 277          | 249          | 224          | 202          | 182          | 164          |
| Bridion                                      | -            | 246          | 270          | 291          | 315          | 330          | 347          | 364          | 375          | 386          | 398          |
| Integrilin                                   | 229          | 210          | 191          | 157          | 102          | 86           | 72           | 62           | 54           | 47           | 42           |
| <b>Other Hospital and Specialty</b>          | <b>708</b>   | <b>887</b>   | <b>839</b>   | <b>789</b>   | <b>724</b>   | <b>693</b>   | <b>669</b>   | <b>651</b>   | <b>631</b>   | <b>616</b>   | <b>604</b>   |

Source: Company data, Citi Research

Figure 42. Merck & Co. Annual Sales Model continued

| \$ mlns                            | 2011A         | 2012E         | 2013E         | 2014E         | 2015E         | 2016E         | 2017E         | 2018E         | 2019E         | 2020E         | 2021E         |
|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>Diversified Brands</b>          |               |               |               |               |               |               |               |               |               |               |               |
| Cozaar / Hyzaar                    | 1,662         | 1,268         | 949           | 759           | 682           | 613           | 551           | 495           | 445           | 400           | 360           |
| Propecia                           | 446           | 428           | 331           | 279           | 183           | 157           | 142           | 128           | 116           | 105           | 95            |
| Zocor                              | 455           | 370           | 287           | 226           | 181           | 146           | 118           | 96            | 78            | 63            | 52            |
| Claritin Rx                        | 314           | 239           | 215           | 193           | 174           | 157           | 141           | 127           | 114           | 103           | 92            |
| Remeron                            | 240           | 231           | 231           | 231           | 231           | 231           | 231           | 231           | 231           | 231           | 231           |
| Proscar                            | 222           | 207           | 176           | 150           | 128           | 109           | 94            | 80            | 69            | 59            | 51            |
| Vasotec / Vaseretic                | 232           | 195           | 175           | 157           | 141           | 127           | 115           | 103           | 93            | 84            | 75            |
| Subutex / Suboxone                 | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>Total</b>                       | <b>3,571</b>  | <b>2,937</b>  | <b>2,363</b>  | <b>1,996</b>  | <b>1,721</b>  | <b>1,540</b>  | <b>1,391</b>  | <b>1,260</b>  | <b>1,145</b>  | <b>1,044</b>  | <b>956</b>    |
| <b>Vaccines</b>                    |               |               |               |               |               |               |               |               |               |               |               |
| Gardasil                           | 1,210         | 1,533         | 1,844         | 2,202         | 2,136         | 2,057         | 2,057         | 2,057         | 2,057         | 2,057         | 2,057         |
| ProQuad, M-M-R II and Varivax      | 1,203         | 1,251         | 1,284         | 1,319         | 1,354         | 1,395         | 1,437         | 1,480         | 1,524         | 1,570         | 1,617         |
| RotaTeq                            | 652           | 642           | 679           | 715           | 750           | 781           | 809           | 838           | 869           | 869           | 869           |
| Zostavax                           | 332           | 654           | 755           | 871           | 968           | 1,049         | 1,128         | 1,206         | 1,291         | 1,382         | 1,481         |
| Pneumovax                          | 499           | 616           | 662           | 270           | 171           | 171           | 171           | 171           | 171           | 171           | 171           |
| Hepatitis Vaccine                  | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Viral Vaccines                     | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Other Vaccines                     | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>Total</b>                       | <b>3,896</b>  | <b>4,695</b>  | <b>5,224</b>  | <b>5,376</b>  | <b>5,379</b>  | <b>5,453</b>  | <b>5,601</b>  | <b>5,752</b>  | <b>5,912</b>  | <b>6,049</b>  | <b>6,194</b>  |
| <b>Other Pharmaceutical</b>        |               |               |               |               |               |               |               |               |               |               |               |
| Other Pharmaceutical (MRK)         | 3,538         | 3,456         | 3,337         | 3,230         | 3,127         | 3,027         | 2,930         | 2,837         | 2,746         | 2,659         | 2,574         |
| Timoptic/ Timoptic XE              | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Zolanza                            | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Aggrastat                          | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Elocon                             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Livial                             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Marvelon                           | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Mercilon                           | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Zemuron                            | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Foradil                            | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>Other Pharmaceuticals (SGP)</b> | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| Impact of EU Austerity             | -             | (98)          | (376)         | (368)         | (347)         | (326)         | (298)         | (277)         | (262)         | (251)         | (239)         |
| <b>Total</b>                       | <b>3,538</b>  | <b>3,358</b>  | <b>2,961</b>  | <b>2,862</b>  | <b>2,780</b>  | <b>2,701</b>  | <b>2,633</b>  | <b>2,560</b>  | <b>2,484</b>  | <b>2,408</b>  | <b>2,335</b>  |
| <b>Phase I Pipeline</b>            | <b>-</b>      | <b>-</b>      | <b>181</b>    | <b>1,075</b>  | <b>2,484</b>  | <b>4,356</b>  | <b>6,245</b>  | <b>8,008</b>  | <b>9,760</b>  | <b>11,239</b> | <b>12,218</b> |
| <b>Total Pharmaceutical Sales</b>  | <b>41,289</b> | <b>40,334</b> | <b>37,520</b> | <b>37,440</b> | <b>36,869</b> | <b>37,164</b> | <b>37,101</b> | <b>37,038</b> | <b>38,384</b> | <b>39,869</b> | <b>40,024</b> |
| Animal Health, Total               | 3,254         | 3,397         | 3,593         | 3,808         | 4,037         | 4,279         | 4,536         | 4,808         | 5,096         | 5,402         | 5,726         |
| Consumer Care, Total               | 1,840         | 1,929         | 1,998         | 2,072         | 2,149         | 2,221         | 2,296         | 2,374         | 2,456         | 2,542         | 2,631         |
| Other Revenues                     | 1,664         | 1,375         | 1,281         | 598           | 338           | 338           | 338           | 338           | 338           | 338           | 338           |
| <b>Total</b>                       | <b>6,758</b>  | <b>6,702</b>  | <b>6,872</b>  | <b>6,479</b>  | <b>6,524</b>  | <b>6,838</b>  | <b>7,170</b>  | <b>7,520</b>  | <b>7,891</b>  | <b>8,282</b>  | <b>8,696</b>  |
| <b>Group Sales</b>                 | <b>48,047</b> | <b>47,035</b> | <b>44,392</b> | <b>43,918</b> | <b>43,393</b> | <b>44,002</b> | <b>44,271</b> | <b>44,559</b> | <b>46,274</b> | <b>48,151</b> | <b>48,720</b> |
| Growth (reported)                  | 4.5%          | -2.1%         | -5.6%         | -1.1%         | -1.2%         | 1.4%          | 0.6%          | 0.6%          | 3.9%          | 4.1%          | 1.2%          |

Source: Company data, Citi Research

Figure 43. Merck & Co. Pipeline

| Product                             | Preclin. | I | II | III | Filed | Year | Peak Sales    | Success Probability | Risk Adj Peak Sales | 2012E | 2013E      | 2014E        | 2015E        | 2016E        | 2017E        | 2018E        | 2019E        | 2020E         | 2021E         |
|-------------------------------------|----------|---|----|-----|-------|------|---------------|---------------------|---------------------|-------|------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|
| <b>Cardiovascular</b>               |          |   |    |     |       |      | <b>10,300</b> |                     | <b>3,862</b>        |       |            |              |              |              |              |              |              |               |               |
| MK-0653C (US) (Atozet)              |          |   |    |     |       | 2013 | -             | 83%                 | -                   | -     | -          | -            | -            | -            | -            | -            | -            | -             | -             |
| MK-0524A (US) (Tredaptive)          |          |   |    |     |       | 2014 | 5,000         | 54%                 | 2,700               | -     | -          | 270          | 675          | 1,080        | 1,466        | 1,858        | 2,201        | 2,460         | 2,624         |
| MK-0524B                            |          |   |    |     |       | 2013 | -             | 54%                 | -                   | -     | -          | -            | -            | -            | -            | -            | -            | -             | -             |
| venakalant i.v. (MK-6621)           |          |   |    |     |       | 2013 | -             | 54%                 | -                   | -     | -          | -            | -            | -            | -            | -            | -            | -             | -             |
| anacetrapib (MK-0859)               |          |   |    |     |       | 2016 | 5,000         | 20%                 | 1,000               | -     | -          | -            | -            | 100          | 250          | 400          | 543          | 688           | 815           |
| Vorapaxar (MK-5348)                 |          |   |    |     |       | 2014 | 300           | 54%                 | 162                 | -     | -          | 16           | 41           | 65           | 88           | 111          | 132          | 148           | 157           |
| Diabetes and Endocrinology          |          |   |    |     |       |      | 5,113         |                     | 3,519               | -     | -          | 203          | 641          | 1,282        | 1,848        | 2,250        | 2,756        | 3,190         | 3,399         |
| odanacatib (MK-0822)                |          |   |    |     |       | 2015 | 2,613         | 83%                 | 2,169               | -     | -          | 203          | 506          | 945          | 1,308        | 1,517        | 1,828        | 2,090         | 2,169         |
| sitagliptin/atorvastatin (MK-0431E) |          |   |    |     |       | 2015 | 500           | 54%                 | 270                 | -     | -          | -            | 27           | 68           | 108          | 147          | 186          | 220           | 246           |
| MK-3102                             |          |   |    |     |       | 2015 | 2,000         | 54%                 | 1,080               | -     | -          | -            | 108          | 270          | 432          | 586          | 743          | 880           | 984           |
| <b>Infectious Diseases</b>          |          |   |    |     |       |      | <b>1,100</b>  |                     | <b>466</b>          |       |            | <b>16</b>    | <b>71</b>    | <b>141</b>   | <b>210</b>   | <b>277</b>   | <b>341</b>   | <b>395</b>    | <b>434</b>    |
| vaniprevir (MK-7009)                |          |   |    |     |       | 2014 | 300           | 54%                 | 162                 | -     | -          | 16           | 41           | 65           | 88           | 111          | 132          | 148           | 157           |
| actoxumab/bezlotoxumab (MK-3415A)   |          |   |    |     |       | 2015 | 400           | 54%                 | 216                 | -     | -          | -            | 22           | 54           | 86           | 117          | 149          | 176           | 197           |
| MK-5172                             |          |   |    |     |       | 2015 | 400           | 22%                 | 88                  | -     | -          | -            | 9            | 22           | 35           | 48           | 61           | 72            | 80            |
| Neuro and Ophthalmology             |          |   |    |     |       |      | 5,600         |                     | 2,403               | -     | 146        | 387          | 645          | 896          | 1,149        | 1,441        | 1,717        | 1,935         | 2,089         |
| suvorexant (MK-4305)                |          |   |    |     |       | 2013 | 1,500         | 83%                 | 1,245               | -     | 125        | 311          | 498          | 676          | 857          | 1,015        | 1,134        | 1,210         | 1,245         |
| Bridion (MK-8616)                   |          |   |    |     |       | 2013 | 400           | 54%                 | 216                 | -     | 22         | 54           | 86           | 117          | 149          | 176          | 197          | 210           | 216           |
| preladenant (MK-3814)               |          |   |    |     |       | 2014 | 400           | 54%                 | 216                 | -     | -          | 22           | 54           | 86           | 117          | 149          | 176          | 197           | 210           |
| MK-3697                             |          |   |    |     |       | 2015 | 100           | 22%                 | 22                  | -     | -          | -            | 2            | 6            | 9            | 12           | 15           | 18            | 20            |
| MK-6096                             |          |   |    |     |       | 2015 | 100           | 22%                 | 22                  | -     | -          | -            | 2            | 6            | 9            | 12           | 15           | 18            | 20            |
| MK-1602                             |          |   |    |     |       | 2015 | 100           | 22%                 | 22                  | -     | -          | -            | 2            | 6            | 9            | 12           | 15           | 18            | 20            |
| MK-8391                             |          |   |    |     |       | 2018 | 3,000         | 22%                 | 660                 | -     | -          | -            | -            | -            | -            | 66           | 165          | 264           | 358           |
| <b>Oncology</b>                     |          |   |    |     |       |      | <b>3,400</b>  |                     | <b>1,097</b>        |       | <b>30</b>  | <b>75</b>    | <b>120</b>   | <b>242</b>   | <b>405</b>   | <b>563</b>   | <b>706</b>   | <b>840</b>    | <b>949</b>    |
| MK-8669 (EU) (US)                   |          |   |    |     |       | 2013 | 100           | 83%                 | 83                  | -     | 8          | 21           | 33           | 45           | 57           | 68           | 76           | 81            | 83            |
| vintafolide (MK-8109)               |          |   |    |     |       | 2013 | 400           | 54%                 | 216                 | -     | 22         | 54           | 86           | 117          | 149          | 176          | 197          | 210           | 216           |
| MK-1775                             |          |   |    |     |       | 2016 | 200           | 22%                 | 44                  | -     | -          | -            | -            | 4            | 11           | 18           | 24           | 30            | 36            |
| MK-2206                             |          |   |    |     |       | 2016 | 800           | 22%                 | 176                 | -     | -          | -            | -            | 18           | 44           | 70           | 96           | 121           | 143           |
| dinacilicb (MK-7965)                |          |   |    |     |       | 2016 | 500           | 54%                 | 270                 | -     | -          | -            | -            | 27           | 68           | 108          | 147          | 186           | 220           |
| dalotuzumab (MK-0646)               |          |   |    |     |       | 2016 | 400           | 22%                 | 88                  | -     | -          | -            | -            | 9            | 22           | 35           | 48           | 61            | 72            |
| MK-3475                             |          |   |    |     |       | 2016 | 1,000         | 22%                 | 220                 | -     | -          | -            | -            | 22           | 55           | 88           | 119          | 151           | 179           |
| <b>Respiratory and Immunology</b>   |          |   |    |     |       |      | <b>2,000</b>  |                     | <b>952</b>          |       |            | <b>43</b>    | <b>108</b>   | <b>225</b>   | <b>365</b>   | <b>505</b>   | <b>634</b>   | <b>751</b>    | <b>844</b>    |
| MK-7243 (AIT Grass)                 |          |   |    |     |       | 2014 | 400           | 54%                 | 216                 | -     | -          | 22           | 54           | 86           | 117          | 149          | 176          | 197           | 210           |
| MK-3641 (AIT Ragweed)               |          |   |    |     |       | 2014 | 400           | 54%                 | 216                 | -     | -          | 22           | 54           | 86           | 117          | 149          | 176          | 197           | 210           |
| MK-8457                             |          |   |    |     |       | 2016 | 400           | 22%                 | 88                  | -     | -          | -            | -            | 9            | 22           | 35           | 48           | 61            | 72            |
| MK-8237                             |          |   |    |     |       | 2016 | 400           | 54%                 | 216                 | -     | -          | -            | -            | 22           | 54           | 86           | 117          | 149           | 176           |
| MK-3222 (anti-IL 23)                |          |   |    |     |       | 2016 | 400           | 54%                 | 216                 | -     | -          | -            | -            | 22           | 54           | 86           | 117          | 149           | 176           |
| <b>Vaccines</b>                     |          |   |    |     |       |      | <b>1,250</b>  |                     | <b>595</b>          |       |            | <b>38</b>    | <b>111</b>   | <b>197</b>   | <b>284</b>   | <b>370</b>   | <b>449</b>   | <b>514</b>    | <b>560</b>    |
| V419                                |          |   |    |     |       | 2014 | 400           | 54%                 | 216                 | -     | -          | 22           | 54           | 86           | 117          | 149          | 176          | 197           | 210           |
| V503 (9 valent)                     |          |   |    |     |       | 2014 | 300           | 54%                 | 162                 | -     | -          | 16           | 41           | 65           | 88           | 111          | 132          | 148           | 157           |
| V212                                |          |   |    |     |       | 2015 | 300           | 54%                 | 162                 | -     | -          | -            | 16           | 41           | 65           | 88           | 111          | 132           | 148           |
| V114                                |          |   |    |     |       | 2016 | 250           | 22%                 | 55                  | -     | -          | -            | -            | 6            | 14           | 22           | 30           | 38            | 45            |
| <b>Women's Health</b>               |          |   |    |     |       |      | <b>1,150</b>  |                     | <b>365</b>          |       | <b>5</b>   | <b>27</b>    | <b>73</b>    | <b>127</b>   | <b>181</b>   | <b>232</b>   | <b>280</b>   | <b>319</b>    | <b>346</b>    |
| ELONVA WW (MK-8962)                 |          |   |    |     |       | 2014 | 250           | 54%                 | 135                 | -     | -          | 14           | 34           | 54           | 73           | 93           | 110          | 123           | 131           |
| NOMAC/E2 (MK-8175A (US))            |          |   |    |     |       | 2013 | 100           | 54%                 | 54                  | -     | 5          | 14           | 22           | 29           | 37           | 44           | 49           | 52            | 54            |
| MK-4618                             |          |   |    |     |       | 2015 | 400           | 22%                 | 88                  | -     | -          | -            | 9            | 22           | 35           | 48           | 61           | 72            | 80            |
| MK-8342                             |          |   |    |     |       | 2015 | 400           | 22%                 | 88                  | -     | -          | -            | 9            | 22           | 35           | 48           | 61           | 72            | 80            |
| <b>TOTAL (\$)</b>                   |          |   |    |     |       |      | <b>28,811</b> |                     | <b>12,942</b>       |       | <b>181</b> | <b>1,075</b> | <b>2,484</b> | <b>4,356</b> | <b>6,245</b> | <b>8,008</b> | <b>9,760</b> | <b>11,239</b> | <b>12,218</b> |

Source: Company data, Citi Research

Figure 44. Merck & Co. Income Statement

| \$ mlns (except per share data)         | 2011A         | 2012E         | 2013E         | 2014E         | 2015E         | 2016E         | 2017E         | 2018E         | 2019E         | 2020E         | 2021E         |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>GROUP</b>                            |               |               |               |               |               |               |               |               |               |               |               |
| Turnover                                | 48,047        | 47,037        | 44,392        | 43,918        | 43,393        | 44,002        | 44,271        | 44,559        | 46,274        | 48,151        | 48,720        |
| % Growth                                | 4.5%          | -2.1%         | -5.6%         | -1.1%         | -1.2%         | 1.4%          | 0.6%          | 0.6%          | 3.9%          | 4.1%          | 1.2%          |
| % Growth (CER)                          |               |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP COGS                           | (11,379)      | (11,351)      | (10,210)      | (9,662)       | (9,113)       | (9,240)       | (9,297)       | (9,357)       | (9,718)       | (10,112)      | (10,231)      |
| % Sales                                 | 23.7%         | 24.1%         | 23.0%         | 22.0%         | 21.0%         | 21.0%         | 21.0%         | 21.0%         | 21.0%         | 21.0%         | 21.0%         |
| % Growth                                | -0.2%         | -0.2%         | -10.0%        | -5.4%         | -5.7%         | 1.4%          | 0.6%          | 0.6%          | 3.9%          | 4.1%          | 1.2%          |
| % Growth (CER)                          | 0.0%          |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                     | (5,492)       | (5,135)       | (4,917)       | (4,362)       | (4,257)       | (3,781)       | (3,781)       | (3,781)       | (3,781)       | (3,163)       | (334)         |
| COGS                                    | (16,871)      | (16,486)      | (15,128)      | (14,024)      | (13,369)      | (13,022)      | (13,078)      | (13,139)      | (13,499)      | (13,274)      | (10,566)      |
| % Sales                                 | 35.1%         | 35.0%         | 34.1%         | 31.9%         | 30.8%         | 29.6%         | 29.5%         | 29.5%         | 29.2%         | 27.6%         | 21.7%         |
| Non-GAAP gross profit                   | 36,668        | 35,686        | 34,182        | 34,256        | 34,281        | 34,762        | 34,974        | 35,201        | 36,557        | 38,039        | 38,489        |
| Non-GAAP gross profit margin            | 76.3%         | 75.9%         | 77.0%         | 78.0%         | 79.0%         | 79.0%         | 79.0%         | 79.0%         | 79.0%         | 79.0%         | 79.0%         |
| % Growth                                | 6.0%          | -2.7%         | -4.2%         | 0.2%          | 0.1%          | 1.4%          | 0.6%          | 0.6%          | 3.9%          | 4.1%          | 1.2%          |
| % Growth (CER)                          | 0.0%          |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                     | (5,492)       | (5,135)       | (4,917)       | (4,362)       | (4,257)       | (3,781)       | (3,781)       | (3,781)       | (3,781)       | (3,163)       | (334)         |
| Gross profit                            | 31,176        | 30,551        | 29,265        | 29,895        | 30,024        | 30,980        | 31,193        | 31,420        | 32,775        | 34,877        | 38,155        |
| Gross profit margin                     | 64.9%         | 65.0%         | 65.9%         | 68.1%         | 69.2%         | 70.4%         | 70.5%         | 70.5%         | 70.8%         | 72.4%         | 78.3%         |
| Non-GAAP SG&A                           | (13,336)      | (12,298)      | (11,764)      | (11,858)      | (11,716)      | (11,617)      | (11,599)      | (11,585)      | (12,031)      | (12,519)      | (12,667)      |
| % Sales                                 | 27.8%         | 26.1%         | 26.5%         | 27.0%         | 27.0%         | 26.4%         | 26.2%         | 26.0%         | 26.0%         | 26.0%         | 26.0%         |
| % Growth                                | 5.8%          | -7.8%         | -4.3%         | 0.8%          | -1.2%         | -0.9%         | -0.2%         | -0.1%         | 3.9%          | 4.1%          | 1.2%          |
| % Growth (CER)                          |               |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                     | (397)         | (333)         | (130)         | (120)         | (110)         | (100)         | -             | -             | -             | -             | -             |
| SG&A                                    | (13,733)      | (12,631)      | (11,894)      | (11,978)      | (11,826)      | (11,717)      | (11,599)      | (11,585)      | (12,031)      | (12,519)      | (12,667)      |
| % Sales                                 | 28.6%         | 26.9%         | 26.8%         | 27.3%         | 27.3%         | 26.6%         | 26.2%         | 26.0%         | 26.0%         | 26.0%         | 26.0%         |
| Non-GAAP R&D                            | (7,742)       | (7,884)       | (8,041)       | (8,202)       | (8,366)       | (8,701)       | (9,049)       | (9,411)       | (9,787)       | (10,179)      | (10,586)      |
| % Sales                                 | 16.1%         | 16.8%         | 18.1%         | 18.7%         | 19.3%         | 19.8%         | 20.4%         | 21.1%         | 21.2%         | 21.1%         | 21.7%         |
| % Growth                                | -6.1%         | 1.8%          | 2.0%          | 2.0%          | 2.0%          | 4.0%          | 4.0%          | 4.0%          | 4.0%          | 4.0%          | 4.0%          |
| % Growth (CER)                          |               |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                     | (725)         | (280)         | (100)         | (90)          | (80)          | (70)          | -             | -             | -             | -             | -             |
| R&D                                     | (8,467)       | (8,164)       | (8,141)       | (8,292)       | (8,446)       | (8,771)       | (9,049)       | (9,411)       | (9,787)       | (10,179)      | (10,586)      |
| % Sales                                 | 17.6%         | 17.4%         | 18.3%         | 18.9%         | 19.5%         | 19.9%         | 20.4%         | 21.1%         | 21.2%         | 21.1%         | 21.7%         |
| Non-GAAP Restructuring costs            | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Non-GAAP adjustment                     | (1,306)       | (573)         | (350)         | (320)         | (290)         | (260)         | -             | -             | -             | -             | -             |
| OOI                                     | (1,306)       | (573)         | (350)         | (320)         | (290)         | (260)         | -             | -             | -             | -             | -             |
| Non-GAAP Equity income from affiliates  | 610           | 606           | 606           | 317           | 29            | 29            | 29            | 29            | 29            | 29            | 29            |
| Non-GAAP adjustment                     | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Equity income from affiliates           | 610           | 606           | 606           | 317           | 29            | 29            | 29            | 29            | 29            | 29            | 29            |
| <b>Non-GAAP operating profit</b>        | <b>16,200</b> | <b>16,111</b> | <b>14,983</b> | <b>14,514</b> | <b>14,227</b> | <b>14,473</b> | <b>14,355</b> | <b>14,234</b> | <b>14,767</b> | <b>15,370</b> | <b>15,265</b> |
| <b>Non-GAAP operating profit margin</b> | <b>33.7%</b>  | <b>34.3%</b>  | <b>33.8%</b>  | <b>33.0%</b>  | <b>32.8%</b>  | <b>32.9%</b>  | <b>32.4%</b>  | <b>31.9%</b>  | <b>31.9%</b>  | <b>31.9%</b>  | <b>31.3%</b>  |
| Margin expansion/(compression)          | 256 bps       | 53 bps        | (50)bps       | (70)bps       | (26)bps       | 11 bps        | (47)bps       | (48)bps       | (3)bps        | 1 bps         | (59)bps       |
| % Growth                                | 13.1%         | -0.6%         | -7.0%         | -3.1%         | -2.0%         | 1.7%          | -0.8%         | -0.8%         | 3.7%          | 4.1%          | -0.7%         |
| % Growth (CER)                          |               |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                     | (7,920)       | (6,321)       | (5,497)       | (4,892)       | (4,737)       | (4,211)       | (3,781)       | (3,781)       | (3,781)       | (3,163)       | (334)         |
| Operating profit                        | <b>8,280</b>  | <b>9,790</b>  | <b>9,486</b>  | <b>9,622</b>  | <b>9,491</b>  | <b>10,262</b> | <b>10,574</b> | <b>10,453</b> | <b>10,986</b> | <b>12,208</b> | <b>14,930</b> |
| <b>Operating profit margin</b>          | <b>17.2%</b>  | <b>20.8%</b>  | <b>21.4%</b>  | <b>21.9%</b>  | <b>21.9%</b>  | <b>23.3%</b>  | <b>23.9%</b>  | <b>23.5%</b>  | <b>23.7%</b>  | <b>25.4%</b>  | <b>30.6%</b>  |
| <b>Interest Expense</b>                 |               |               |               |               |               |               |               |               |               |               |               |
| Interest payable                        | (737)         | (750)         | (750)         | (762)         | (762)         | (762)         | (762)         | (762)         | (762)         | (762)         | (762)         |
| Interest income                         | 186           | 280           | 256           | 283           | 296           | 308           | 320           | 337           | 362           | 396           | 436           |
| Net finance costs                       | (551)         | (470)         | (494)         | (479)         | (466)         | (455)         | (442)         | (425)         | (400)         | (366)         | (326)         |
| Non-GAAP net finance costs              | (551)         | (470)         | (494)         | (479)         | (466)         | (455)         | (442)         | (425)         | (400)         | (366)         | (326)         |
| Non-GAAP adjustment                     | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |

Source: Company data, Citi Research

Figure 45. Merck & Co. Income Statement continued

| \$ mlns (except per share data)                         | 2011A         | 2012E         | 2013E         | 2014E         | 2015E         | 2016E         | 2017E         | 2018E         | 2019E         | 2020E         | 2021E         |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Non-GAAP share of after tax profits of associates & JVs | (224)         | (105)         | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Non-GAAP adjustment                                     | (172)         | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Share of after tax profits of associates & JVs          | (396)         | (105)         | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>Non-GAAP profit before tax</b>                       | <b>15,425</b> | <b>15,536</b> | <b>14,489</b> | <b>14,035</b> | <b>13,761</b> | <b>14,019</b> | <b>13,913</b> | <b>13,809</b> | <b>14,367</b> | <b>15,004</b> | <b>14,938</b> |
| Non-GAAP profit before tax margin                       | 32.1%         | 33.0%         | 32.6%         | 32.0%         | 31.7%         | 31.9%         | 31.4%         | 31.0%         | 31.0%         | 31.2%         | 30.7%         |
| % Growth  | 13.8%         | 0.7%          | -6.7%         | -3.1%         | -1.9%         | 1.9%          | -0.8%         | -0.7%         | 4.0%          | 4.4%          | -0.4%         |
| % Growth (CER)  |               |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                                     | (8,092)       | (6,321)       | (5,497)       | (4,892)       | (4,737)       | (4,211)       | (3,781)       | (3,781)       | (3,781)       | (3,163)       | (334)         |
| <b>Profit before tax</b>                                | <b>7,333</b>  | <b>9,215</b>  | <b>8,992</b>  | <b>9,143</b>  | <b>9,024</b>  | <b>9,807</b>  | <b>10,132</b> | <b>10,028</b> | <b>10,586</b> | <b>11,842</b> | <b>14,604</b> |
| Profit before tax margin                                | 15.3%         | 19.6%         | 20.3%         | 20.8%         | 20.8%         | 22.3%         | 22.9%         | 22.5%         | 22.9%         | 24.6%         | 30.0%         |
| Non-GAAP tax  | (3,607)       | (3,824)       | (3,477)       | (3,509)       | (3,440)       | (3,505)       | (3,478)       | (3,452)       | (3,592)       | (3,751)       | (3,735)       |
| Non-GAAP effective tax rate                             | 23.4%         | 24.6%         | 24.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         |
| % Growth  | 32.9%         | 6.0%          | -9.1%         | 0.9%          | -1.9%         | 1.9%          | -0.8%         | -0.7%         | 4.0%          | 4.4%          | -0.4%         |
| Non-GAAP adjustment                                     | (2,666)       | (1,269)       | (1,319)       | (1,223)       | (1,184)       | (1,053)       | (945)         | (945)         | (945)         | (791)         | (84)          |
| Tax   | (941)         | (2,556)       | (2,158)       | (2,286)       | (2,256)       | (2,452)       | (2,533)       | (2,507)       | (2,646)       | (2,960)       | (3,651)       |
| Effective tax rate                                      | 12.8%         | 27.7%         | 24.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         | 25.0%         |
| <b>Non-GAAP profit after tax</b>                        | <b>11,818</b> | <b>11,711</b> | <b>11,012</b> | <b>10,526</b> | <b>10,321</b> | <b>10,514</b> | <b>10,435</b> | <b>10,357</b> | <b>10,775</b> | <b>11,253</b> | <b>11,204</b> |
| Non-GAAP profit after tax margin                        | 32.2%         | 32.8%         | 32.2%         | 30.7%         | 30.1%         | 30.2%         | 29.8%         | 29.4%         | 29.5%         | 29.6%         | 29.1%         |
| % Growth  | 9.1%          | -0.9%         | -6.0%         | -4.4%         | -1.9%         | 1.9%          | -0.8%         | -0.7%         | 4.0%          | 4.4%          | -0.4%         |
| % Growth (CER)  |               |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                                     | (5,426)       | (5,052)       | (4,178)       | (3,669)       | (3,553)       | (3,158)       | (2,836)       | (2,836)       | (2,836)       | (2,372)       | (251)         |
| <b>Profit after tax</b>                                 | <b>6,392</b>  | <b>6,659</b>  | <b>6,834</b>  | <b>6,857</b>  | <b>6,768</b>  | <b>7,356</b>  | <b>7,599</b>  | <b>7,521</b>  | <b>7,939</b>  | <b>8,881</b>  | <b>10,953</b> |
| Profit after tax margin                                 | 13.3%         | 14.2%         | 15.4%         | 15.6%         | 15.6%         | 16.7%         | 17.2%         | 16.9%         | 17.2%         | 18.4%         | 22.5%         |
| Profit attributable to non-controlling interests        | (120)         | (120)         | (113)         | (112)         | (111)         | (112)         | (113)         | (114)         | (118)         | (123)         | (124)         |
| <b>Non-GAAP profit attributable to shareholders</b>     | <b>11,698</b> | <b>11,591</b> | <b>10,898</b> | <b>10,414</b> | <b>10,210</b> | <b>10,402</b> | <b>10,322</b> | <b>10,243</b> | <b>10,657</b> | <b>11,130</b> | <b>11,080</b> |
| % Growth  | 9.2%          | -0.9%         | -6.0%         | -4.4%         | -2.0%         | 1.9%          | -0.8%         | -0.8%         | 4.0%          | 4.4%          | -0.5%         |
| % Growth (CER)  |               |               |               |               |               |               |               |               |               |               |               |
| Non-GAAP adjustment                                     | (5,426)       | (5,052)       | (4,178)       | (3,669)       | (3,553)       | (3,158)       | (2,836)       | (2,836)       | (2,836)       | (2,372)       | (251)         |
| <b>Profit attributable to shareholders</b>              | <b>6,272</b>  | <b>6,539</b>  | <b>6,721</b>  | <b>6,745</b>  | <b>6,658</b>  | <b>7,243</b>  | <b>7,486</b>  | <b>7,407</b>  | <b>7,821</b>  | <b>8,758</b>  | <b>10,829</b> |
| Less: Income allocated to participating securities      | (15)          | (6)           | (6)           | (6)           | (6)           | (6)           | (6)           | (6)           | (6)           | (6)           | (6)           |
| <b>Net income allocated to common shareholders</b>      | <b>6,257</b>  | <b>6,533</b>  | <b>6,715</b>  | <b>6,740</b>  | <b>6,652</b>  | <b>7,238</b>  | <b>7,481</b>  | <b>7,402</b>  | <b>7,816</b>  | <b>8,753</b>  | <b>10,823</b> |
| Non-GAAP adjustment for participating securities        | (27)          | (13)          | (13)          | (13)          | (13)          | (13)          | (13)          | (13)          | (13)          | (13)          | (13)          |
| Non GAAPNet income allocated to common shareholders     | <b>11,671</b> | <b>11,578</b> | <b>10,885</b> | <b>10,401</b> | <b>10,197</b> | <b>10,389</b> | <b>10,309</b> | <b>10,230</b> | <b>10,644</b> | <b>11,117</b> | <b>11,067</b> |
| Shares Outstanding (basic)                              | 3,071         | 3,040         | 2,958         | 2,868         | 2,758         | 2,659         | 2,569         | 2,489         | 2,425         | 2,374         | 2,335         |
| Shares Outstanding (diluted)                            | 3,094         | 3,063         | 2,981         | 2,891         | 2,781         | 2,682         | 2,592         | 2,512         | 2,448         | 2,397         | 2,358         |
| <b>Non-GAAP EPS (diluted)</b>                           | <b>3.77</b>   | <b>3.78</b>   | <b>3.65</b>   | <b>3.60</b>   | <b>3.67</b>   | <b>3.87</b>   | <b>3.98</b>   | <b>4.07</b>   | <b>4.35</b>   | <b>4.64</b>   | <b>4.69</b>   |
| % Growth  | 10.3%         | 0.2%          | -3.4%         | -1.5%         | 1.9%          | 5.6%          | 2.7%          | 2.4%          | 6.8%          | 6.7%          | 1.2%          |
| <b>GAAP EPS (diluted)</b>                               | <b>2.02</b>   | <b>2.13</b>   | <b>2.25</b>   | <b>2.33</b>   | <b>2.39</b>   | <b>2.70</b>   | <b>2.89</b>   | <b>2.95</b>   | <b>3.19</b>   | <b>3.65</b>   | <b>4.59</b>   |
| % Growth  | 634.5%        | 5.5%          | 5.6%          | 3.5%          | 2.6%          | 12.8%         | 7.0%          | 2.1%          | 8.4%          | 14.4%         | 25.7%         |
| <b>Non-GAAP EPS (basic)</b>                             | <b>3.80</b>   | <b>3.81</b>   | <b>3.68</b>   | <b>3.63</b>   | <b>3.70</b>   | <b>3.91</b>   | <b>4.02</b>   | <b>4.11</b>   | <b>4.39</b>   | <b>4.69</b>   | <b>4.74</b>   |
| % Growth  | 9.9%          | 0.2%          | -3.4%         | -1.5%         | 1.9%          | 5.7%          | 2.7%          | 2.4%          | 6.8%          | 6.7%          | 1.2%          |
| <b>GAAP EPS (basic)</b>                                 | <b>2.04</b>   | <b>2.15</b>   | <b>2.27</b>   | <b>2.35</b>   | <b>2.41</b>   | <b>2.72</b>   | <b>2.91</b>   | <b>2.97</b>   | <b>3.22</b>   | <b>3.69</b>   | <b>4.63</b>   |
| % Growth  | 634.1%        | 5.5%          | 5.7%          | 3.5%          | 2.6%          | 12.8%         | 7.0%          | 2.1%          | 8.4%          | 14.4%         | 25.7%         |
| Dividends   | 4,790         | 5,108         | 4,969         | 4,818         | 4,633         | 4,468         | 4,315         | 4,181         | 4,074         | 3,988         | 3,924         |
| DPS (\$)  | 1.56          | 1.68          | 1.68          | 1.68          | 1.68          | 1.68          | 1.68          | 1.68          | 1.68          | 1.68          | 1.68          |

Source: Company data, Citi Research



Figure 46. Merck & Co. Annual Cash Flow Statement

| \$ mlns  | 2011A         | 2012E          | 2013E          | 2014E           | 2015E           | 2016E          | 2017E          | 2018E          | 2019E          | 2020E          | 2021E          |
|--|---------------|----------------|----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Cash flows from operating activities</b>  |               |                |                |                 |                 |                |                |                |                |                |                |
| <b>Net income</b>  | <b>6,392</b>  | <b>6,659</b>   | <b>6,834</b>   | <b>6,857</b>    | <b>6,768</b>    | <b>7,356</b>   | <b>7,599</b>   | <b>7,521</b>   | <b>7,939</b>   | <b>8,881</b>   | <b>10,953</b>  |
| <i>Adjustments to reconcile net income to net cash provided by operating activities:</i> |               |                |                |                 |                 |                |                |                |                |                |                |
| Depreciation and amortization  | 7,427         | 7,028          | 6,927          | 6,423           | 6,372           | 5,953          | 6,011          | 6,071          | 6,134          | 5,580          | 2,818          |
| Intangible asset impairment charges  | 705           |                |                |                 |                 |                |                |                |                |                |                |
| Profit on sale of equity investments   | -136          |                |                |                 |                 |                |                |                |                |                |                |
| Equity income from affiliates  | -610          |                |                |                 |                 |                |                |                |                |                |                |
| Dividends and distributions from equity affiliates                                       | 216           |                |                |                 |                 |                |                |                |                |                |                |
| Deferred income taxes  | -1,537        | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Share-based compensation   | 369           | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Other  | 323           |                |                |                 |                 |                |                |                |                |                |                |
| <i>Net changes in assets and liabilities:</i>  |               |                |                |                 |                 |                |                |                |                |                |                |
| Accounts receivable  | -1,168        | 623            | 429            | 77              | 85              | (99)           | (44)           | (47)           | (279)          | (305)          | (92)           |
| Inventories  | -678          | 208            | 831            | 492             | 468             | (60)           | (26)           | (28)           | (168)          | (184)          | (56)           |
| Trade accounts payable   | 182           | 160            | (492)          | (28)            | 41              | (110)          | 227            | (147)          | 409            | (250)          | 26             |
| Accrued and other current liabilities  | 1,444         | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Income taxes payable   | -277          | 142            | (29)           | 13              | (12)            | 73             | 29             | (11)           | 50             | 115            | 257            |
| Other  | -7            | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Noncurrent liabilities   | -262          | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| <b>Cash generated from operations</b>  | <b>12,383</b> | <b>14,819</b>  | <b>14,500</b>  | <b>13,834</b>   | <b>13,723</b>   | <b>13,113</b>  | <b>13,796</b>  | <b>13,358</b>  | <b>14,085</b>  | <b>13,837</b>  | <b>13,906</b>  |
| <b>Cash flow from investing activities</b>   |               |                |                |                 |                 |                |                |                |                |                |                |
| Purchase of tangible fixed assets  | -1,723        | (2,205)        | (2,183)        | (1,883)         | (1,940)         | (1,998)        | (2,058)        | (2,120)        | (2,183)        | (2,249)        | (2,316)        |
| Purchases of securities and other investments  | -7,325        | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Proceeds from sales of securities and other investments                                  | 6,149         | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Proceeds from sale of interest in equity method investment                               | 175           |                |                |                 |                 |                |                |                |                |                |                |
| Acquisitions of businesses, net of cash acquired   | -373          |                |                |                 |                 |                |                |                |                |                |                |
| Dispositions of businesses, net of cash divested   | 323           |                |                |                 |                 |                |                |                |                |                |                |
| Schering-Plough merger, net of cash acquired   | -             |                |                |                 |                 |                |                |                |                |                |                |
| Proceeds from AstraZeneca LP asset option exercise                                       | -             |                |                |                 |                 |                |                |                |                |                |                |
| Decrease in restricted assets  | -             |                |                |                 |                 |                |                |                |                |                |                |
| Other  | -116          | (200)          | (204)          | (208)           | (212)           | (216)          | (221)          | (225)          | (230)          | (234)          | (239)          |
| <b>Net cash outflow from investing activities</b>  | <b>-2,890</b> | <b>(2,405)</b> | <b>(2,387)</b> | <b>(2,091)</b>  | <b>(2,152)</b>  | <b>(2,215)</b> | <b>(2,279)</b> | <b>(2,345)</b> | <b>(2,413)</b> | <b>(2,483)</b> | <b>(2,555)</b> |
| <b>Cash flow from financing activities</b>   |               |                |                |                 |                 |                |                |                |                |                |                |
| Proceeds from own shares for employee share options                                      | 321           | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Purchase of treasury shares  | -1,921        | (2,075)        | (2,900)        | (5,534)         | (5,489)         | (5,245)        | (5,518)        | (4,675)        | (4,226)        | (3,459)        | (2,781)        |
| Increase in long-term loans  | -             | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Repayment of long-term loans   | -1,547        | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Net change in short-term borrowings  | 1,076         | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| Dividends paid to stockholders   | -4,691        | (5,108)        | (4,969)        | (4,818)         | (4,633)         | (4,468)        | (4,315)        | (4,181)        | (4,074)        | (3,988)        | (3,924)        |
| Other Dividends paid   | -120          | (120)          | (113)          | (112)           | (111)           | (112)          | (113)          | (114)          | (118)          | (123)          | (124)          |
| Other  | -22           | -              | -              | -               | -               | -              | -              | -              | -              | -              | -              |
| <b>Net cash outflow from financing activities</b>  | <b>-6,904</b> | <b>(7,302)</b> | <b>(7,982)</b> | <b>(10,463)</b> | <b>(10,233)</b> | <b>(9,825)</b> | <b>(9,946)</b> | <b>(8,970)</b> | <b>(8,417)</b> | <b>(7,570)</b> | <b>(6,829)</b> |
| <b>Increase in cash and cash equivalents in the year</b>                                 | <b>2,631</b>  | <b>5,111</b>   | <b>4,131</b>   | <b>1,279</b>    | <b>1,337</b>    | <b>1,073</b>   | <b>1,571</b>   | <b>2,043</b>   | <b>3,255</b>   | <b>3,784</b>   | <b>4,522</b>   |
| <b>Cash and cash equivalents at beginning of year</b>                                    | <b>10,900</b> | <b>13,531</b>  | <b>18,642</b>  | <b>22,773</b>   | <b>24,052</b>   | <b>25,390</b>  | <b>26,463</b>  | <b>28,033</b>  | <b>30,076</b>  | <b>33,331</b>  | <b>37,116</b>  |
| <b>Cash and cash equivalents at end of year</b>  | <b>13,531</b> | <b>18,642</b>  | <b>22,773</b>  | <b>24,052</b>   | <b>25,390</b>   | <b>26,463</b>  | <b>28,033</b>  | <b>30,076</b>  | <b>33,331</b>  | <b>37,116</b>  | <b>41,637</b>  |
| <b>Cash and cash equivalents (balance sheet)</b>   | <b>13,531</b> | <b>18,642</b>  | <b>22,773</b>  | <b>24,052</b>   | <b>25,390</b>   | <b>26,463</b>  | <b>28,033</b>  | <b>30,076</b>  | <b>33,331</b>  | <b>37,116</b>  | <b>41,637</b>  |
| Free Cash Flow from Operations   | 11,540        | 12,944         | 12,552         | 12,162          | 11,974          | 11,288         | 11,849         | 11,332         | 11,972         | 11,629         | 11,596         |

Source: Company data, Citi Research

Figure 47. Merck & Co. Annual Balance Sheet

| \$ mlns   | 2011A          | 2012E          | 2013E          | 2014E         | 2015E         | 2016E         | 2017E         | 2018E         | 2019E         | 2020E         | 2021E         |
|---|----------------|----------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>ASSETS</b>                                       |                |                |                |               |               |               |               |               |               |               |               |
| Current assets                                      |                |                |                |               |               |               |               |               |               |               |               |
| Cash and cash equivalents                           | 13,531         | 18,642         | 22,773         | 24,052        | 25,390        | 26,463        | 28,033        | 30,076        | 33,331        | 37,116        | 41,637        |
| Short-term investments                              | 1,441          | 1,441          | 1,441          | 1,441         | 1,441         | 1,441         | 1,441         | 1,441         | 1,441         | 1,441         | 1,441         |
| Accounts receivable                                 | 8,261          | 7,638          | 7,209          | 7,132         | 7,047         | 7,146         | 7,189         | 7,236         | 7,515         | 7,819         | 7,912         |
| Inventories   | 6,254          | 6,046          | 5,215          | 4,723         | 4,255         | 4,314         | 4,341         | 4,369         | 4,537         | 4,721         | 4,777         |
| Deferred income taxes and other current assets      | 3,694          | 3,694          | 3,694          | 3,694         | 3,694         | 3,694         | 3,694         | 3,694         | 3,694         | 3,694         | 3,694         |
| <b>Total current assets</b>                         | <b>33,181</b>  | <b>37,462</b>  | <b>40,332</b>  | <b>41,042</b> | <b>41,826</b> | <b>43,058</b> | <b>44,698</b> | <b>46,816</b> | <b>50,518</b> | <b>54,791</b> | <b>59,461</b> |
| Non-current assets                                  |                |                |                |               |               |               |               |               |               |               |               |
| Property, plant and equipment                       | 16,297         | 16,470         | 16,544         | 16,266        | 15,990        | 15,717        | 15,445        | 15,175        | 14,906        | 14,638        | 14,371        |
| Goodwill  | 12,155         | 12,155         | 12,155         | 12,155        | 12,155        | 12,155        | 12,155        | 12,155        | 12,155        | 12,155        | 12,155        |
| Other intangible assets                             | 34,302         | 29,507         | 24,894         | 20,840        | 16,896        | 13,431        | 9,970         | 6,514         | 3,063         | 234           | 239           |
| Investments   | 3,458          | 3,458          | 3,458          | 3,458         | 3,458         | 3,458         | 3,458         | 3,458         | 3,458         | 3,458         | 3,458         |
| Other non-current assets                            | 5,735          | 5,735          | 5,735          | 5,735         | 5,735         | 5,735         | 5,735         | 5,735         | 5,735         | 5,735         | 5,735         |
| <b>Total non-current assets</b>                     | <b>71,947</b>  | <b>67,325</b>  | <b>62,785</b>  | <b>58,454</b> | <b>54,234</b> | <b>50,496</b> | <b>46,764</b> | <b>43,038</b> | <b>39,317</b> | <b>36,221</b> | <b>35,958</b> |
| <b>TOTAL ASSETS</b>                                 | <b>105,128</b> | <b>104,787</b> | <b>103,117</b> | <b>99,496</b> | <b>96,060</b> | <b>93,553</b> | <b>91,462</b> | <b>89,854</b> | <b>89,835</b> | <b>91,012</b> | <b>95,419</b> |
| <b>LIABILITIES</b>                                  |                |                |                |               |               |               |               |               |               |               |               |
| Current liabilities                                 |                |                |                |               |               |               |               |               |               |               |               |
| Loans payable and current portion of long-term debt | 1,990          | 1,990          | 1,990          | 1,990         | 1,990         | 1,990         | 1,990         | 1,990         | 1,990         | 1,990         | 1,990         |
| Trade accounts payable                              | 2,462          | 2,622          | 2,129          | 2,102         | 2,142         | 2,033         | 2,260         | 2,112         | 2,521         | 2,271         | 2,297         |
| Accrued and other current liabilities               | 9,731          | 9,731          | 9,731          | 9,731         | 9,731         | 9,731         | 9,731         | 9,731         | 9,731         | 9,731         | 9,731         |
| Income taxes payable                                | 781            | 923            | 895            | 908           | 895           | 968           | 997           | 986           | 1,036         | 1,151         | 1,408         |
| Dividends payables                                  | 1,281          | 1,281          | 1,281          | 1,281         | 1,281         | 1,281         | 1,281         | 1,281         | 1,281         | 1,281         | 1,281         |
| <b>Total current liabilities</b>                    | <b>16,245</b>  | <b>16,547</b>  | <b>16,026</b>  | <b>16,011</b> | <b>16,040</b> | <b>16,003</b> | <b>16,259</b> | <b>16,100</b> | <b>16,559</b> | <b>16,425</b> | <b>16,708</b> |
| Non-current liabilities                             |                |                |                |               |               |               |               |               |               |               |               |
| Long-term borrowings                                | 15,525         | 15,525         | 15,525         | 15,525        | 15,525        | 15,525        | 15,525        | 15,525        | 15,525        | 15,525        | 15,525        |
| Deferred Income Taxes and Noncurrent Liabilities    | 16,415         | 16,415         | 16,415         | 16,415        | 16,415        | 16,415        | 16,415        | 16,415        | 16,415        | 16,415        | 16,415        |
| <b>Total non-current liabilities</b>                | <b>31,940</b>  | <b>31,940</b>  | <b>31,940</b>  | <b>31,940</b> | <b>31,940</b> | <b>31,940</b> | <b>31,940</b> | <b>31,940</b> | <b>31,940</b> | <b>31,940</b> | <b>31,940</b> |
| <b>TOTAL LIABILITIES</b>                            | <b>48,185</b>  | <b>48,487</b>  | <b>47,966</b>  | <b>47,951</b> | <b>47,980</b> | <b>47,943</b> | <b>48,199</b> | <b>48,040</b> | <b>48,499</b> | <b>48,365</b> | <b>48,648</b> |
| <b>NET ASSETS</b>                                   | <b>56,943</b>  | <b>56,300</b>  | <b>55,151</b>  | <b>51,545</b> | <b>48,080</b> | <b>45,610</b> | <b>43,263</b> | <b>41,814</b> | <b>41,336</b> | <b>42,647</b> | <b>46,771</b> |
| <b>EQUITY</b>                                       |                |                |                |               |               |               |               |               |               |               |               |
| Common stock  | 1,788          | 1,788          | 1,788          | 1,788         | 1,788         | 1,788         | 1,788         | 1,788         | 1,788         | 1,788         | 1,788         |
| Other paid-in capital                               | 40,663         | 40,663         | 40,663         | 40,663        | 40,663        | 40,663        | 40,663        | 40,663        | 40,663        | 40,663        | 40,663        |
| Treasury stock, at cost                             | (23,792)       | (23,792)       | (23,792)       | (23,792)      | (23,792)      | (23,792)      | (23,792)      | (23,792)      | (23,792)      | (23,792)      | (23,792)      |
| Retained earnings                                   | 38,990         | 38,347         | 37,198         | 33,592        | 30,127        | 27,657        | 25,310        | 23,861        | 23,383        | 24,694        | 28,818        |
| Accumulated other comprehensive loss                | (3,132)        | (3,132)        | (3,132)        | (3,132)       | (3,132)       | (3,132)       | (3,132)       | (3,132)       | (3,132)       | (3,132)       | (3,132)       |
|   | <b>54,517</b>  | <b>53,874</b>  | <b>52,725</b>  | <b>49,119</b> | <b>45,654</b> | <b>43,184</b> | <b>40,837</b> | <b>39,388</b> | <b>38,910</b> | <b>40,221</b> | <b>44,345</b> |
| Equity minority interests                           | 2,426          | 2,426          | 2,426          | 2,426         | 2,426         | 2,426         | 2,426         | 2,426         | 2,426         | 2,426         | 2,426         |
| <b>TOTAL EQUITY</b>                                 | <b>56,943</b>  | <b>56,300</b>  | <b>55,151</b>  | <b>51,545</b> | <b>48,080</b> | <b>45,610</b> | <b>43,263</b> | <b>41,814</b> | <b>41,336</b> | <b>42,647</b> | <b>46,771</b> |

Source: Company data, Citi Research

## Key Catalysts

Figure 48. Merck & Co. Key Potential Catalysts

| Date     | Product              | Event Category | Event Sub-type         | Comment   |
|----------|----------------------|----------------|------------------------|---|
| Dec 2012 | Maxalt               | Legal          | Generic Launch         | Maxalt loses market exclusivity in U.S.   |
| 1Q 2013  | Tredaptive           | Clinical       | Data Release           | Results of HPS2-THRIVE Cardiovascular outcomes study expected   |
| 4Q 2012  | Bridion              | Regulatory     | US Filing              | Bridion US filing expected by end of 2012   |
| 4Q 2012  | Dulera               | Regulatory     | US PDUFA / Action Date | Dulera potential re-submission for COPD in ~2H12  |
| 4Q 2012  | MK-8931              | Clinical       | Trial Initiation       | MK-8931 (oral BACE inhibitor) Ph2 programme for AD expected to initiate   |
| 4Q 2012  | MK-3222              | Clinical       | Trial Initiation       | MK-3222 in psoriasis Ph-III program expected to initiate later this year / early 2013                             |
| 4Q 2012  | Ridaforolimus        | Regulatory     | EU CHMP Opinion        | Potential EU opinion on ridaforolimus in sarcoma around mid-year  |
| 4Q 2012  | Atozet (Combo)       | Regulatory     | US Filing              | Response to FDA CRL on Vytorin/atorvastatin combo   |
| Feb 2013 | Singulair            | Legal          | Generic Launch         | Singulair loses market exclusivity in major European markets in Feb 2013  |
| Mar 2013 | Vytorin              | Clinical       | Status Update          | Next interim analysis by Data Safety Monitoring Board (DSMB) for IMPROVE-IT outcomes trial                        |
| Jun 2013 | Vytorin              | Clinical       | Status Update          | Final outcome for IMPROVE-IT outcomes trial   |
| 1H 2013  | Odanacatib           | Regulatory     | EU Filing              | Odanacatib--filing expected for osteoporosis in EU in 1H13  |
| 1H 2013  | Odanacatib           | Regulatory     | US Filing              | Odanacatib--filing expected for osteoporosis in US in 1H13  |
| Aug 2013 | Temodar              | Legal          | Generic Launch         | Temodar loses market exclusivity in U.S.  |
| 3Q 2013  | Odanacatib           | Regulatory     | Japan Filing           | Odanacatib--filing expected for osteoporosis in Japan in 3Q13   |
| 2013     | Suvorexant           | Regulatory     | US PDUFA / Action Date | Suvorexant/MK-4305 (orexin inhibitor)--filing for insomnia (accepted on 11/8/12)                                  |
| 2013     | Tredaptive           | Regulatory     | US Filing              | Tredaptive--filing expected for atherosclerosis pending positive results from Ph3 HPS2-THRIVE in US               |
| 2013     | Tredaptive           | Regulatory     | EU Filing              | Tredaptive--filing expected for atherosclerosis pending positive results from Ph3 HPS2-THRIVE in EU               |
| 2013     | Vorapaxar            | Regulatory     | US Filing              | Vorapaxar filing as anti-thrombotic agent in US expected in 2013  |
| 2013     | Vorapaxar            | Regulatory     | EU Filing              | Vorapaxar filing as anti-thrombotic agent in EU expected in 2013  |
| 2013     | Vintafolide          | Regulatory     | EU Filing              | Vintafolide filing expected for lung and ovarian cancer in EU by end of 2013                                      |
| 2013     | 5-Valent HPV Vaccine | Regulatory     | US Filing              | Next-generation 5 valent HPV vaccine (V503) - filing expected for prevention of cervical cancer by end of 2013    |
| 2013     | AIT Grass            | Regulatory     | US Filing              | US filing for AIT Grass expected  |
| 2013     | AIT Ragweed          | Regulatory     | US Filing              | US filing for AIT Ragweed expected  |
| 2013     | Anacetrapib          | Clinical       | Other                  | Anacetrapib Ph3 REVEAL full study enrollment targeted for 2013)   |
| 1Q 2014  | Anacetrapib          | Clinical       | Data Release           | Anacetrapib Ph3 DEFINE extension data expected early 2014"  |
| Jun 2014 | Nexium/Prilosec      | Corporate      | Partnership            | AZN has option to acquire MRK's stake in AZLP in June 2014  |
| 2H 2014  | Vytorin              | Clinical       | Data Release           | Results of ph3 outcomes IMPROVE-IT trial for Vytorin  |
| Dec 2014 | Januvia              | Clinical       | Status Update          | Completion of Januvia cardiovascular outcomes study (TECOS) expected  |
| 2014     | Preladenant          | Regulatory     | US Filing              | US filing for preladenant in parkinson's disease expected   |
| 2014     | Vaniprevir           | Regulatory     | Japan Filing           | Japan filing for vaniprevir in hepatitis C expected   |
| 2014     | MK-3415              | Regulatory     | US Filing              | US filing for MK-3415A in C. difficile infections expected  |
| 2014     | V212                 | Regulatory     | US Filing              | US filing for V212 (inactivated herpes zoster vaccine) in hematopoietic cell transplants expected                 |
| 1H 2015  | Remicade             | Legal          | Patent Expiry          | Patent expiry for Remicade in majority of EU countries in early 2015 (assuming 6-months of pediatric exclusivity) |
| 2017     | Anacetrapib          | Clinical       | Data Release           | Anacetrapib Ph3 REVEAL completion   |

Source: Citi Research

## Merck & Co

### Company description

Merck (MRK) is a leading research-based pharmaceutical company that focuses on drug discovery for human and animal diseases. The company has key franchises in the cardiovascular, diabetes, infectious diseases and women's health markets. In 2011, Merck generated approximately \$48bn in group sales, with ~85% coming from human pharmaceuticals (\$41.3 billion) and the remaining 15% (\$6.7bn) from animal health and consumer care.

### Investment strategy

We rate Merck Neutral. The stock trades at 12x 2014E PE in line with large-cap US sector average, for an anticipated 2014E-19E EPS CAGR of 4% vs sector at 7%.

Our near-term assessment of the stock is coloured by our negative view of the outcome of IMPROVE-IT trial with Vytorin. We anticipate significant revenue, EBIT and post tax earnings decline for the company post 2017 patent expiration for both Vytorin and Zetia. Our base case DCF-derived Intrinsic Value is \$49, 11% above the current share price but lower than other Buy-rated names within the sector. We would use any share price weakness around IMPROVE-IT data to revisit our thesis, given our belief that the stock price appears to be already discounting failure of this trial.

### Valuation

Our Target Price of \$44 implies a 12.2x 2014E multiple in line with current average US large-cap pharma sector multiple. We anticipate 2014-19E non-GAAP EPS CAGR of 4% for Merck vs the sector's 7%.

Our DCF-derived Intrinsic Value is \$49. We project free cash flows for an explicit forecast period of 10 years and thereafter apply terminal growth assumptions. Consistent with our sector methodology, we employ a CAPM-derived WACC of 8.2% and assume a 0% terminal growth rate.

### Risks

The key downside risks to our thesis include i) failure of key pipeline drug odanacatib for osteoporosis, although unlikely, due to adverse events - we note an excess of respiratory symptoms with odanactib in phase II trials; ii) failure of key cardiovascular drug Tredaptive to show a benefit in ongoing HPS-THRIVE2 study; iii) failure of diabetes drug Januvia to show a cardiovascular benefit in the ongoing long-term outcomes TECOS trial.

Key upside risks include i) a significant benefit shown by Vytorin in lowering cardiovascular events which we estimate is worth \$1.65/share; ii) despite the failure of other drugs in this class, CETP inhibitor anacetrapib could show a positive effect on cardiovascular risk - we estimate peak sales potential of \$5bn; iii) a positive CV outcome data from the TECOS trial with Januvia could lead to a significant uplift in DPP-4 inhibitor usage and franchise sales.

**Notes**

**Notes**

## Appendix A-1

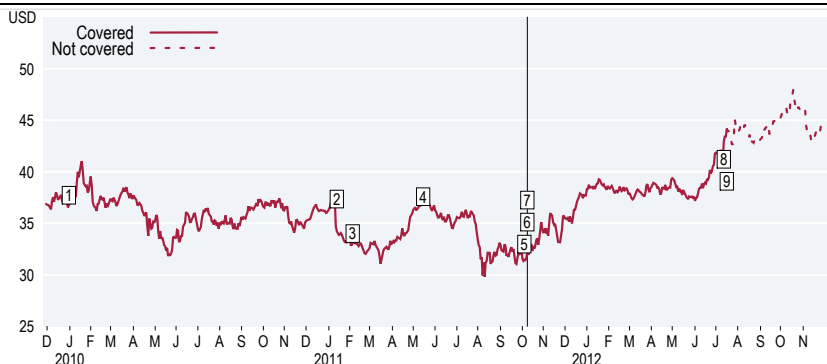
### Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of this research report are named in bold text in the author block at the front of the product except for those sections where an analyst's name appears in bold alongside content which is attributable to that analyst. Each of these analyst(s) certify, with respect to the section(s) of the report for which they are responsible, that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc and its affiliates. No part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this report.

### IMPORTANT DISCLOSURES

#### Merck & Co (MRK)

##### Ratings and Target Price History Fundamental Research



|   | Date      | Rating | Target Price | Closing Price |
|---|-----------|--------|--------------|---------------|
| 1 | 31-Dec-09 | 1M     | *45.00       | 36.54         |
| 2 | 13-Jan-11 | *2M    | *39.00       | 34.23         |
| 3 | 4-Feb-11  | 2M     | *34.00       | 32.89         |

\* Indicates change

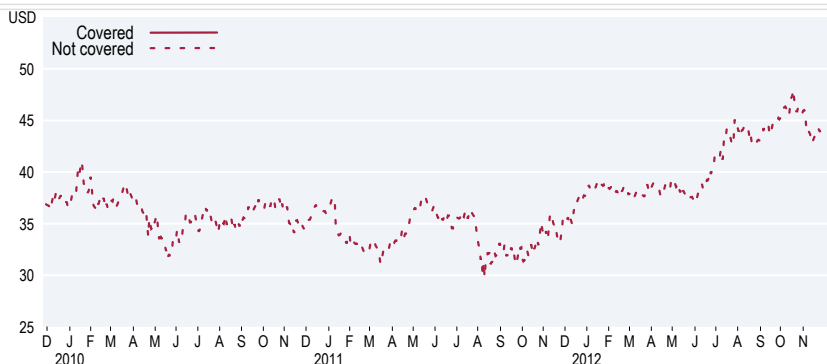
|   | Date      | Rating                      | Target Price | Closing Price |
|---|-----------|-----------------------------|--------------|---------------|
| 4 | 15-May-11 | 2M                          | *37.00       | 37.08         |
| 5 | 5-Oct-11  | 2M                          | *34.00       | 31.47         |
| 6 | 8-Oct-11  | Stock rating system changed |              |               |

|   | Date      | Rating              | Target Price | Closing Price |
|---|-----------|---------------------|--------------|---------------|
| 7 | 8-Oct-11  | *2                  | 34.00        | 31.61         |
| 8 | 12-Jul-12 | *1                  | *50.00       | 42.91         |
| 9 | 17-Jul-12 | Coverage terminated |              |               |

Rating/target price changes above reflect Eastern Standard Time

#### Merck & Co (MRK)

##### Ratings and Target Price History Best Ideas Research Relative Call (3 Month)



\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Merck & Co Inc

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Abbott Laboratories

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Allergan Inc

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Amgen Inc

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Bristol-Myers Squibb Co

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Forest Laboratories Inc

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Johnson & Johnson

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Eli Lilly and Co

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Pfizer Inc

The Chairman of Citi serves as a director of Roche Holding AG.

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Sanofi SA

Within the past 12 months, Citigroup Global Markets Inc. or its affiliates has acted as manager or co-manager of an offering of securities of Merck & Co, Amgen Inc, Bristol Myers Squibb, GlaxoSmithKline PLC.

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from Merck & Co, Abbott Laboratories, Allergan, Inc., Amgen Inc, Bayer AG, Bristol Myers Squibb, GlaxoSmithKline PLC, Johnson & Johnson Inc, Eli Lilly, Merck KGaA, Novartis AG, Novo Nordisk A/S, Pfizer, Roche Holding AG, Sanofi SA, Shire Pharmaceuticals.

Citigroup Global Markets Inc. or an affiliate received compensation for products and services other than investment banking services from Merck & Co, Abbott Laboratories, Allergan, Inc., Amgen Inc, AstraZeneca PLC, Bayer AG, Bristol Myers Squibb, GlaxoSmithKline PLC, Johnson & Johnson Inc, Eli Lilly, Merck KGaA, Novartis AG, Novo Nordisk A/S, Pfizer, Roche Holding AG, Sanofi SA, Shire Pharmaceuticals in the past 12 months.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as investment banking client(s): Amgen Inc, Roche Holding AG, Bristol Myers Squibb, Merck & Co, Abbott Laboratories, Allergan, Inc., Bayer AG, GlaxoSmithKline PLC, Johnson & Johnson Inc, Eli Lilly, Merck KGaA, Novartis AG, Novo Nordisk A/S, Pfizer, Sanofi SA, Shire Pharmaceuticals.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, securities-related: Merck & Co, Abbott Laboratories, Allergan, Inc., Amgen Inc, AstraZeneca PLC, Bayer AG, Bristol Myers Squibb, GlaxoSmithKline PLC, Johnson & Johnson Inc, Eli Lilly, Merck KGaA, Novartis AG, Novo Nordisk A/S, Pfizer, Roche Holding AG, Sanofi SA, Shire Pharmaceuticals.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, non-securities-related: Merck & Co, Abbott Laboratories, Allergan, Inc., Amgen Inc, AstraZeneca PLC, Bayer AG, Bristol Myers Squibb, GlaxoSmithKline PLC, Johnson & Johnson Inc, Eli Lilly, Merck KGaA, Novartis AG, Novo Nordisk A/S, Pfizer, Roche Holding AG, Sanofi SA, Shire Pharmaceuticals.

Citigroup Global Markets Inc. or an affiliate received compensation in the past 12 months from Amgen Inc.

Analysts' compensation is determined based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates ("the Firm"). Like all Firm employees, analysts receive compensation that is impacted by overall firm profitability which includes investment banking revenues.

The Firm is a market maker in the publicly traded equity securities of Amgen Inc, Bayer AG, Roche Holding AG, Sanofi SA, Shire Pharmaceuticals.

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's disclosure website at [https://www.citivelocity.com/cvr/epublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/epublic/citi_research_disclosures). Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Historical disclosures (for up to the past three years) will be provided upon request.

#### Citi Research Ratings Distribution

##### Data current as of 4 Oct 2012

Citi Research Global Fundamental Coverage

% of companies in each rating category that are investment banking clients

| 12 Month Rating |      |      | Relative Rating |      |      |
|-----------------|------|------|-----------------|------|------|
| Buy             | Hold | Sell | Buy             | Hold | Sell |
| 51%             | 38%  | 11%  | 7%              | 85%  | 7%   |
| 50%             | 47%  | 45%  | 59%             | 47%  | 50%  |

##### Guide to Citi Research Fundamental Research Investment Ratings:

Citi Research stock recommendations include an investment rating and an optional risk rating to highlight high risk stocks.

**Risk rating** takes into account both price volatility and fundamental criteria. Stocks will either have no risk rating or a High risk rating assigned.

**Investment Ratings:** Citi Research investment ratings are Buy, Neutral and Sell. Our ratings are a function of analyst expectations of expected total return ("ETR") and risk. ETR is the sum of the forecast price appreciation (or depreciation) plus the dividend yield for a stock within the next 12 months. The Investment rating definitions are: Buy (1) ETR of 15% or more or 25% or more for High risk stocks; and Sell (3) for negative ETR. Any covered stock not assigned a Buy or a Sell is a Neutral (2). For stocks rated Neutral (2), if an analyst believes that there are insufficient valuation drivers and/or investment catalysts to derive a positive or negative investment view, they may elect with the approval of Citi Research management not to assign a target price and, thus, not derive an ETR. Analysts may place covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and / or trading in the company's securities (e.g. trading suspension). As soon as practically possible, the analyst will publish a note re-establishing a rating and investment thesis. To satisfy regulatory requirements, we correspond Under Review and Neutral to Hold in our ratings distribution table for our 12-month fundamental rating system. However, we reiterate that we do not consider Under Review to be a recommendation.

**Relative three-month ratings:** Citi Research may also assign a three-month relative call (or rating) to a stock to highlight expected out-performance (most preferred) or under-performance (least preferred) versus the geographic and industry sector over a 3 month period. The relative call may highlight a specific near-term catalyst or event impacting the company or the market that is anticipated to have a short-term price impact on the equity securities of the company. Absent any specific catalyst the analyst(s) will indicate the most and least preferred stocks in the universe of stocks under consideration, explaining the basis for this short-term view. This three-month view may be different from and does not affect a stock's fundamental equity rating, which reflects a longer-term total absolute return expectation. For purposes of NASD/NYSE ratings-distribution-disclosure rules, most preferred calls correspond to a buy recommendation and least preferred calls correspond to a sell recommendation. Any stock not assigned to a most preferred or least preferred call is considered non-relative-rated (NRR). For purposes of NASD/NYSE ratings-distribution-disclosure rules we correspond NRR to Hold in our ratings distribution table for our 3-month relative rating system. However, we reiterate that we do not consider NRR to be a recommendation.

Prior to October 8, 2011, the firm's stock recommendation system included a risk rating and an investment rating. **Risk ratings**, which took into account both price volatility and fundamental criteria, were: Low (L), Medium (M), High (H), and Speculative (S). **Investment Ratings** of Buy, Hold and Sell were a function of the Citi Research expectation of total return (forecast price appreciation and dividend yield within the next 12 months) and risk rating. Additionally, analysts could have placed covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and/or trading in the company's securities (e.g. trading suspension). Stocks placed "Under Review" were monitored daily by management and as practically possible, the analyst published a note re-establishing a rating and investment thesis. For securities in developed markets



(US, UK, Europe, Japan, and Australia/New Zealand), investment ratings were: Buy (1) (expected total return of 10% or more for Low-Risk stocks, 15% or more for Medium-Risk stocks, 20% or more for High-Risk stocks, and 35% or more for Speculative stocks); Hold (2) (0%-10% for Low-Risk stocks, 0%-15% for Medium-Risk stocks, 0%-20% for High-Risk stocks, and 0%-35% for Speculative stocks); and Sell (3) (negative total return). For securities in emerging markets (Asia Pacific, Emerging Europe/Middle East/Africa, and Latin America), investment ratings were: Buy (1) (expected total return of 15% or more for Low-Risk stocks, 20% or more for Medium-Risk stocks, 30% or more for High-Risk stocks, and 40% or more for Speculative stocks); Hold (2) (5%-15% for Low-Risk stocks, 10%-20% for Medium-Risk stocks, 15%-30% for High-Risk stocks, and 20%-40% for Speculative stocks); and Sell (3) (5% or less for Low-Risk stocks, 10% or less for Medium-Risk stocks, 15% or less for High-Risk stocks, and 20% or less for Speculative stocks).

Investment ratings are determined by the ranges described above at the time of initiation of coverage, a change in investment and/or risk rating, or a change in target price (subject to limited management discretion). At other times, the expected total returns may fall outside of these ranges because of market price movements and/or other short-term volatility or trading patterns. Such interim deviations from specified ranges will be permitted but will become subject to review by Research Management. Your decision to buy or sell a security should be based upon your personal investment objectives and should be made only after evaluating the stock's expected performance and risk.

#### NON-US RESEARCH ANALYST DISCLOSURES

Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the NYSE Rule 472 and NASD Rule 2711 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. The legal entities employing the authors of this report are listed below:

|  |   |
|--|---|
| Citigroup Global Markets Ltd                   | Andrew S Baum; Mark Dainty, ACA; Joanne Jerman; Matthew M Hartley   |
| Citigroup Global Markets Inc                   | Liav Abraham; Nirav Jhaveri, CFA; Matthew J Dodds; Yaron Werber, MD |
| Citigroup Global Markets India Private Limited | Ramaswamy Narayanan, CFA  |

#### OTHER DISCLOSURES

The subject company's share price set out on the front page of this Product is quoted as at 28 November 2012 09:54 AM on the issuer's primary market.

Citigroup Global Markets Inc. and/or its affiliates has a significant financial interest in relation to Merck & Co, Abbott Laboratories, Allergan, Inc., Amgen Inc, AstraZeneca PLC, Bayer AG, Bristol Myers Squibb, GlaxoSmithKline PLC, Johnson & Johnson Inc, Eli Lilly, Merck KGaA, Novo Nordisk A/S, Pfizer, Roche Holding AG, Sanofi SA. (For an explanation of the determination of significant financial interest, please refer to the policy for managing conflicts of interest which can be found at [www.citiVelocity.com](http://www.citiVelocity.com).)

This Product has been modified by the author following a discussion with one or more of the named issuers/issuers of the named securities.

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Citigroup Global Markets Inc. or its affiliates acts as a corporate broker to GlaxoSmithKline PLC.

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of Citi Research to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

**Important Disclosures for Morgan Stanley Smith Barney LLC Customers:** Morgan Stanley & Co. LLC (Morgan Stanley) research reports may be available about the companies that are the subject of this Citi Research research report. Ask your Financial Advisor or use smithbarney.com to view any available Morgan Stanley research reports in addition to Citi Research research reports.

Important disclosure regarding the relationship between the companies that are the subject of this Citi Research research report and Morgan Stanley Smith Barney LLC and its affiliates are available at the Morgan Stanley Smith Barney disclosure website at [www.morganstanleysmithbarney.com/researchdisclosures](http://www.morganstanleysmithbarney.com/researchdisclosures).

For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to [www.morganstanley.com/researchdisclosures](http://www.morganstanley.com/researchdisclosures) and [https://www.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures).

This Citi Research research report has been reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval was conducted by the same person who reviewed this research report on behalf of Citi Research. This could create a conflict of interest.

**The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by.** The Product is made available in **Australia** through Citi Global Markets Australia Pty Ltd. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is made available in **France** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 1-5 Rue Paul Cézanne, 8ème, Paris, France. The Product is distributed in **Germany** by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. Bakhtawar, Nariman Point, Mumbai 400-021. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A., Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Italy** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. Via dei Mercanti, 12, Milan, 20121, Italy. The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. <http://dis.kofia.or.kr/fs/dis2/fundMgr/DISFundMgrAnalystPop.jsp?companyCd2=A03030&pageDiv=02>. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Company No. 460819-D) ("CGMM") to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comisión Nacional Bancaria y de Valores. Reforma 398, Col. Juárez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to 'wholesale clients' only as defined by s5C(1) of the Financial Advisers Act 2008 ('FAA') through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku

Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. ("CGMSPL"), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigroup/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigroup/Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in **Spain** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gasset, 4th Floor, Madrid, 28006, Spain. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan and/or through Citibank Securities (Taiwan) Company Limited ("CSTL"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the respective license scope of each entity and the applicable laws and regulations in the Republic of China. CGMTS and CSTL are both regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS and CSTL]. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Büyükdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E.**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. This material may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in **United States** by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is regulated by Financial Services Authority. Pursuant to Comissão de Valores Mobiliários Rule 483, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Many European regulators require that a firm must establish, implement and make available a policy for managing conflicts of interest arising as a result of publication or distribution of investment research. The policy applicable to Citi Research's Products can be found at [https://www.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures).

Compensation of equity research analysts is determined by equity research management and Citigroup's senior management and is not linked to specific transactions or recommendations.

The Product may have been distributed simultaneously, in multiple formats, to the Firm's worldwide institutional and retail customers. The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product. With the exception of our product that is made available only to Qualified Institutional Buyers (QIBs) and other product that is made available through other distribution channels only to certain categories of clients to satisfy legal or regulatory requirements, Citi Research concurrently disseminates its research via proprietary and non-proprietary electronic distribution platforms. Periodically, individual Citi Research analysts may also opt to circulate research posted on

such platforms to one or more clients by email. Such email distribution is discretionary and is done only after the research has been disseminated via the aforementioned distribution channels. Citi Research simultaneously distributes product that is limited to QIBs only through email distribution. The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with Citi and legal and regulatory constraints. Citi Research product may source data from dataCentral. dataCentral is a Citi Research proprietary database, which includes Citi estimates, data from company reports and feeds from Reuters and Datastream.

---

© 2012 Citigroup Global Markets Inc. Citi Research is a division of Citigroup Global Markets Inc. Citi and Citi with Arc Design are trademarks and service marks of Citigroup Inc. and its affiliates and are used and registered throughout the world. All rights reserved. Any unauthorized use, duplication, redistribution or disclosure of this report (the "Product"), including, but not limited to, redistribution of the Product by electronic mail, posting of the Product on a website or page, and/or providing to a third party a link to the Product, is prohibited by law and will result in prosecution. The information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient to any third party. Where included in this report, MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, redisseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are services marks of MSCI and its affiliates. The Firm accepts no liability whatsoever for the actions of third parties. The Product may provide the addresses of, or contain hyperlinks to, websites. Except to the extent to which the Product refers to website material of the Firm, the Firm has not reviewed the linked site. Equally, except to the extent to which the Product refers to website material of the Firm, the Firm takes no responsibility for, and makes no representations or warranties whatsoever as to, the data and information contained therein. Such address or hyperlink (including addresses or hyperlinks to website material of the Firm) is provided solely for your convenience and information and the content of the linked site does not in anyway form part of this document. Accessing such website or following such link through the Product or the website of the Firm shall be at your own risk and the Firm shall have no liability arising out of, or in connection with, any such referenced website.

---

ADDITIONAL INFORMATION IS AVAILABLE UPON REQUEST

---