



## Deflationary forces intensify

### The Federal Reserve will do whatever it takes to avoid falling prices in the United States

The consumer price index (CPI) has been freefalling for several months. Pressures on prices have dissipated rapidly due to the effects of the abrupt correction in energy prices and a severe recession worldwide. Some measurements of inflation expectation have completely turned around, quickly putting deflation fears back at centre stage. The markets responded by pushing bond rates down sharply, with 10-year Treasuries reaching a recent low of near 2.00%.

In the short term, it is likely that oil's decline of more than US\$100/barrel in the second half of 2008 will lead to a negative annual change in the total CPI. This is not much of a worry, however, in that 1) the downward effects promise to be temporary and 2) the index's decline does not reflect a drop in all consumer prices. The point at issue is the degree to which the economic downturn and tightened credit conditions could trigger a substantial pullback by underlying inflation, or even widespread deflation.

In this *Economic Viewpoint*, we take a look at the real risks of deflation. We show that the increase in economic slack and the potential impacts on wages of the sharp deterioration in the labour market are a big concern. There is also a risk that a very tepid recovery by private domestic demand (household consumption and business investment) by mid-2010 could bring on a bigger and more lasting drop in goods prices than expected, a situation exacerbated by the impacts on import prices of the synchronized global downturn.

Yet true deflation is still unlikely. First, service prices (excluding energy), such as prices for health care and lodging, are very stable, and should continue to move upward. Also, self-sustained deflation (or a deflation spiral) requires wage reductions, a scenario that is not very plausible given the nominal rigidity of wages, and unanchoring of inflation expectations. The Federal Reserve (Fed) is better placed than anyone else to know the damage this would do to the American economy and every effort will be made to avoid this type of scenario. In the worst of cases, the Fed will not hesitate to resort to the money printer to inject huge amounts of capital into the financial system.

We project that core inflation will gradually moderate over the next few quarters, reaching a low of 0.5% toward mid-2010. At this level, however, we must be aware that the frontier between sharp disinflation and deflation is a very thin one. Given that the downside risks to growth are dominant, a slight deflation scenario cannot be ruled out.

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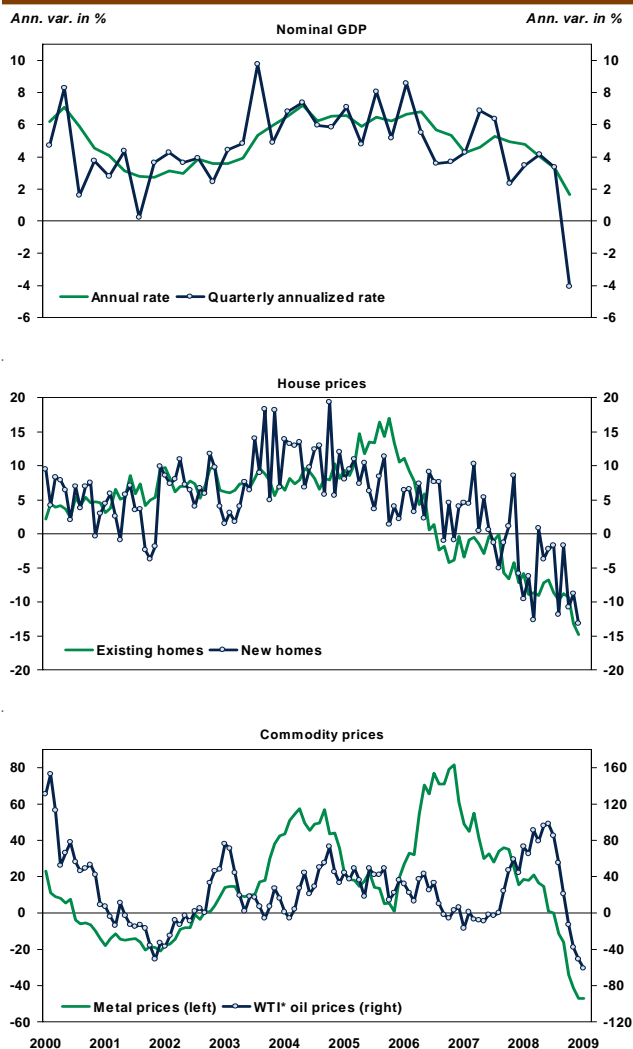
NOTE TO READERS: The letters k, M and B are used in texts and tables to refer to thousands, millions and billions respectively.

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**INFLATION, DISINFLATION ... DEFLATION!**

Whether we are speaking of the contraction in the nominal GDP, crumbling house prices, tumble in stock market prices or collapse in commodity prices, the United States is showing all of the characteristics of an economy that is on the verge of deflation (graph 1).

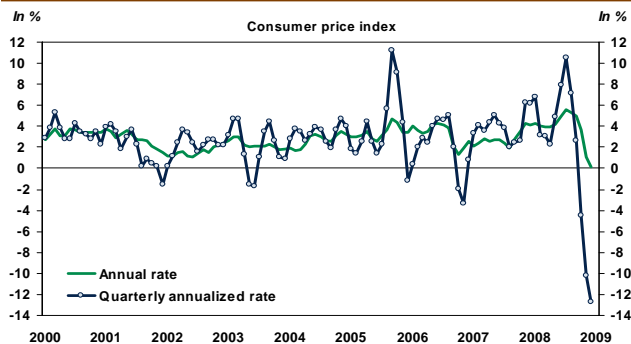
**Graph 1 – The U.S. economy is showing all the signs of deflation**



\* West Texas Intermediate.  
Sources: Datastream and Desjardins, Economic Studies

Because of the sharp drop in energy prices since July of 2008, the CPI has undergone monthly declines over the last five months. The annual change fell to just 0.1% in December (graph 2), the smallest growth since 1955.

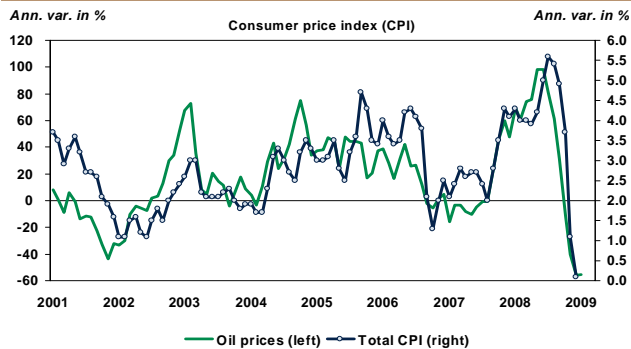
**Graph 2 – Inflation, disinflation... deflation?**



Sources: Datastream and Desjardins, Economic Studies

Insofar as the CPI's decline is essentially a reflection of the drop in energy prices, deflation is not a problem, in itself (graph 3). First, it helps to rebuild some of consumers' buying power. Also, its effects may only be temporary. If we assume that, at current levels, oil prices are pricing in much of the market's expectations regarding the economic downturn, crude prices probably reached a trough at the end of 2008. Under these circumstances, oil prices would only have to stabilize to wipe out the negative contribution after a year.

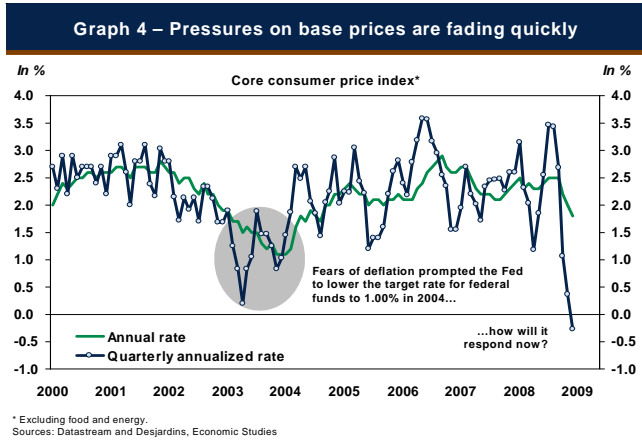
**Graph 3 – Energy prices' sharp drop led to a substantial decline in total inflation**



Sources: Bureau of Labor Statistics and Desjardins, Economic Studies

However, to gauge deflationary pressures properly, what is important to watch is the evolution in core inflation. The problem is that the economic difficulties have magnified the CPI's downward movement beyond the energy price effects. Among other things, consumers' obvious pessimism prompted retailers to slash their prices with the onset of the holiday season. Clothing prices fell three times in the last four months of 2008. Moreover, the auto sector's problems are being reflected in a drastic tumble by the "transportation" component, for the fifth straight month in December.

The core index (which excludes food and energy) thus recorded two monthly declines at the end of 2008, quickly putting deflation fears back at centre stage (graph 4).



**SHOULD WE ANTICIPATE THE WORST?**

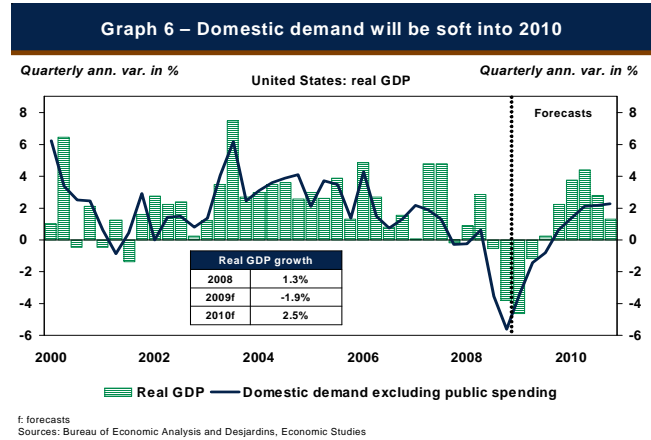
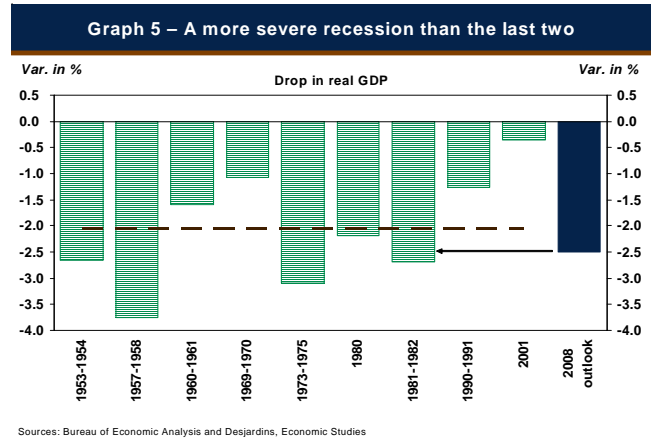
A deflationary spiral, characterized by widespread wage and price declines and unanchored inflation expectations, is unlikely. However, we cannot completely rule out a deflation scenario in the United States due to the sharp drop in demand (see box 1 on page 4 for more details on the adverse impacts of deflation).

The economic context has worsened substantially in recent months. As government actions did not manage to re-establish a climate of confidence, the ongoing financial crisis made the value of assets nosedive, resulting in a decline in household wealth. The uncertainty created by this situation prompted households and businesses to put off expenditures, reducing the demand for consumer goods and equipment, a situation that was magnified by the widespread disruptions in the credit markets.

In this climate of uncertainty, the U.S. real GDP is now expected to contract by more than 2.5% during this bear cycle. This would be equivalent to a production loss comparable to those racked up during the 1974-1975 and 1980-1982 recessions (graph 5).

Because of the economic stimulus plan and low key interest rates, we still expect activity to recover at the end of 2009 and 2010. However, the risks are still broadly tilted to the downside and, lacking the traditional growth drivers (construction, consumption and private investment), the recovery promises to be modest at best (graph 6).

Under these conditions, the possibility of seeing the annual change in core CPI slide into negative territory makes sense.



To see this, we look at the factors that are likely to have an influence on underlying inflation in the next few quarters.

**FREEFALLING EMPLOYMENT**

First, we look at how the labour market is evolving. This approach is key, given 1) the theoretical link between inflation and the jobless rate and 2) the impacts of the job market's deterioration on nominal wage growth.

The latest data are damning, attesting to the biggest correction in employment since the Great Depression of the 30s (graph 7). In all, more than 3,500,000 jobs have already been lost since the recession began; and, combined with layoff announcements, the most recent statistics suggest that the market will decline further in the coming months (graph 8).

Our economic scenario calls for it to bottom out around mid-2009, which could translate into over 5,000,000 jobs lost in all and a jobless rate in the neighbourhood of 9% south of the border. However, in a context in which the economic recovery is delayed or there are lagged effects on employment due to problems with quickly and effectively disposing of

**Box 1****Deflation: causes and consequences****What is this scourge?**

“Deflation” occurs when prices in general are on a downward spiral. It is the direct opposite of inflation. It must not be confused with disinflation which is a diminishing pace in the increase of prices.

Generally, an extended deflationary period causes global demand and production to spiral downward and usually degenerates into a harsh recession which can often lead to an economic depression.

One of the initial effects of deflation is shrinking consumer spending since, in a context of falling prices, consumers will want to wait for further drops before making purchases.

This drop is followed by a downturn in business revenues and profits, which will eventually curb salary hikes and job creation, and might lead to massive layoffs. Fixed nominal salaries which, in a context of falling prices, push real wages up, also causing a downturn in jobs. Once consumer spending has begun to wane, the vicious circle sets in because the drop in household spending generates a further drop in business revenues.

Deflation also has a substantial impact on the track record of economic agents (households, businesses and governments) since it boosts their actual debt level and reduces the real value of their assets. This leads to supplementary credit risks and, in general, a surge in non-performing loans that can also spark bankruptcies.

Finally, a drop in price levels can very often prevent key lending rates, in real terms, to be negative as the central banks would have it in such a situation, in the hopes of stimulating the economy as much as possible. The impact of deflation goes to show to what extent this occurrence, albeit very rare, must be dreaded like the scourge.

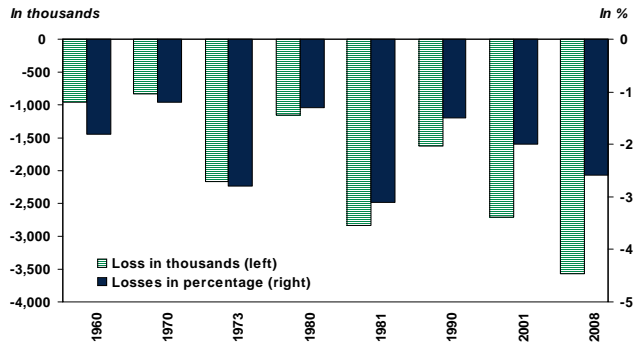
**Why do deflationary periods occur?**

There are two major chains of events that spark deflation. First, a dismal event, usually economic, must take place. It can be in the realm of national wealth, with the drop of stocks and real estate asset prices, or of a structural nature, such as an overly rigid labour market. It can also be caused by geopolitical change such as Germany’s reunification in the 90s.

Second, the negative shock must be linked to a currency exchange rate policy that is out of touch with the country’s context, or a monetary policy slow to react (which amplifies the downturn in economic activity and, in turn, price indices) or structural problems that prevent the economy from adjusting to these phenomena post shock.

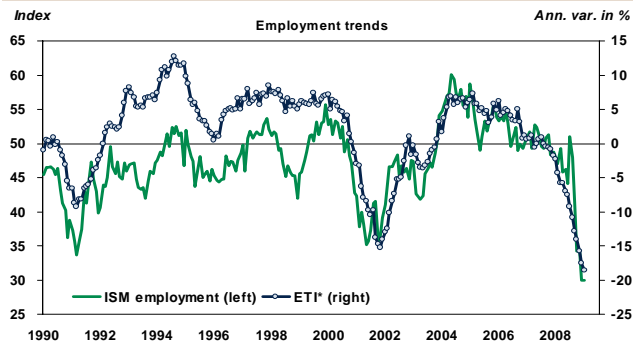
Periods of deflation therefore appear on the heels of unfortunate events, when there is a real overvaluation of the national currency, a slow reaction or a reaction out of sync with monetary policy and structural firmness. In sum, deflation is the outcome of strategic errors in economic policies. Furthermore, it is true that the spectre of deflation has become more plausible lately due to the globalization of industrial production and the weakening of banks’ situations in many countries.

Graph 7 – Job losses are already colossal...



Sources: Datastream and Desjardins, Economic Studies

Graph 8 – ...and the outlook remains grim



\* Conference Board Employment Trends Index.  
Sources: Datastream, Bloomberg and Desjardins, Economic Studies

the government funds allocated to the economy's recovery, it is easy to imagine employment taking much longer to come back than forecast, with the jobless rate climbing into the double digits.

**THE PHILLIPS CURVE SUGGESTS A PERIOD OF DEFLATION**

In a context of low inflation, a deterioration of almost 5 percentage point in the jobless rate could increase the risks of deflation substantially.

We model the relationship between unemployment and inflation using the Phillips curve equation (see box 2 on page 6 for more details on the Phillips curve):

$$(1) \quad \pi_t = \pi^e - a(\mu_t - \mu^*) + u_t$$

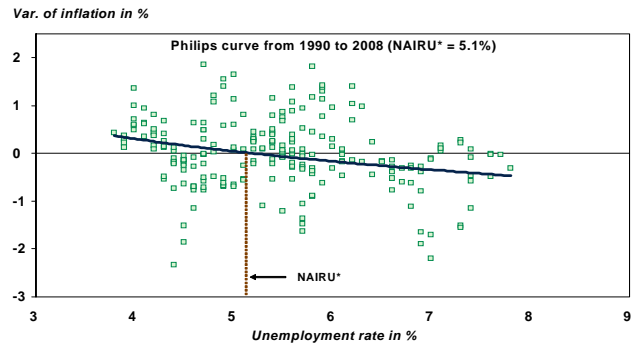
where inflation ( $\pi_t$ ) is a function of inflation expectations ( $\pi^e$ ), the gap between the jobless rate ( $\mu_t$ ) and the NAIUR<sup>1</sup> ( $\mu^*$ ) (i.e. the jobless rate that prevails when the economy is operating at full potential) and shocks ( $u_t$ ) such as changes in oil prices, exchange rates, taxation, etc.

Assuming that inflation expectations are adaptive<sup>2</sup>, we rearrange equation (1) to estimate the NAIUR:

$$(2) \quad \pi_t - \pi^e = a(\mu^* - \mu_t) + u_t$$

The NAIUR varies over time based on demographic, political, economic and technological factors. For the 1990 to 2008 period, characterized by low volatility in economic growth and inflation, we get a non-inflationary jobless rate of 5.1%, a level that is in line with other empirical results<sup>3</sup> (graph 9).

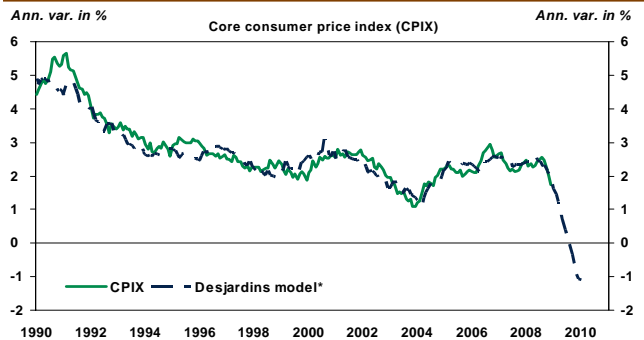
Graph 9 – The Phillips curve shows a negative relationship between unemployment and inflation



\* Non-Accelerating Inflation Rate of Unemployment.  
Sources: Datastream and Desjardins, Economic Studies

This allows us to regress the change in inflation over the output gap. We thus show that the annual change in core inflation could go below -1.0% in 2010 (graph 10).

Graph 10 – The deterioration in the economic situation is compatible with a period of deflation



\* Model based on inflation expectations, the money supply, jobless rate, oil prices, unit labour cost and the stock market.  
Sources: Datastream and Desjardins, Economic Studies

<sup>1</sup> Non-Accelerating Inflation Rate of Unemployment.

<sup>2</sup> Our hypothesis is that inflation expectations are based on the average of the last twelve months.

<sup>3</sup> The Congressional Budget Office of the United States estimate the NAIUR at 4.8%.

**Box 2**  
**Phillips Curve<sup>1</sup>**

Fundamentally, the Phillips curve shows the relation between inflation and unemployment. The curve indicates that a low inflation rate is associated with a high unemployment rate, and that a high inflation rate is associated with a low unemployment rate. Over time, the concept of the Phillips curve was refined to take inflation expectations and supply shocks into account.

Modern debate about the connection between inflation and unemployment really began after the publication of a study by economist Alban William Phillips. It demonstrated an inverse, non-linear, stable relation between the rate of change in wages and unemployment in the United Kingdom. Since then, the concept of the Phillips curve has evolved substantially. The modern Phillips curve pinpoints three sources for inflation: “expected” inflation, the gap between unemployment and its natural rate and supply shocks (e.g., oil shock). We now also distinguish between the short-run Phillips curve and the long-run Phillips curve.

In the short term, the Phillips curve shows the relation between inflation and unemployment for a given expected inflation rate and a given natural unemployment rate<sup>2</sup>. When aggregate demand unexpectedly goes up, companies raise the prices of their products to prevent an inventory shortage and use more inputs (workers, raw materials, etc.) to increase output. Stronger demand for workers makes unemployment go down, but also tends to make wages go up. The same logic applies to the other inputs: their prices tend to rise with demand. An unexpected increase in demand thus pushes the inflation rate up and brings the unemployment rate down. Using this logic, an unexpected decrease in demand will push the inflation rate down and make the unemployment rate go up.

An increase in expected inflation makes the Phillips curve move up, while a decrease in expected inflation takes it down. An increase in the natural unemployment rate pushes the curve to the right, while a decrease in this rate pushes it to the left. Supply shocks can also make the Phillips curve move up or down. In the long run, as the economy is at full employment (natural employment rate), the unemployment rate no longer has an impact on the inflation rate. It will depend on economic agents’ expectations.

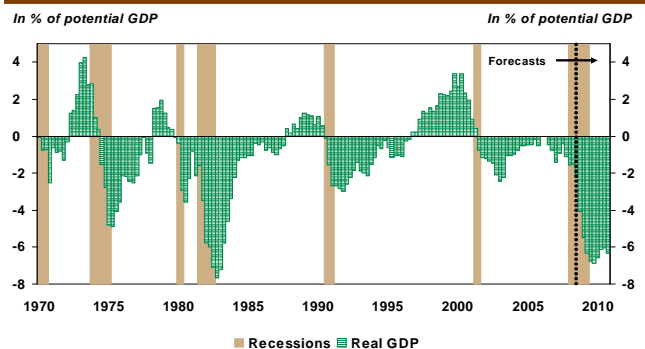
<sup>1</sup> DESJARDINS, ECONOMIC STUDIES. Practical Guide to Economic Concepts and Theories, 1st ed., 2007, 220 pages, [http://www.desjardins.com/en/a\_propos/etudes\_economiques/dossiers/concepts-theories/index.jsp]

<sup>2</sup> The natural unemployment rate is the unemployment rate that is recorded with a full-employment economy.

**SURPLUS PRODUCTION CAPACITY, JOB LOSSES, WAGE DECREASES**

This theoretical slip into deflation (later, we will see that the Fed will do everything it can to avoid it) is not, in itself, a surprise. The downside pressures that stem from the drop in commodity prices are being magnified by the recession’s impacts on production capacity utilization. After a year of recession, the economy is now evolving at more than 4% under potential GDP; our forecasts suggest that the gap could widen quickly to almost 6% and stay there until the end of 2010 (graph 11). Unless economic growth accelerates, the gap may not close until the end of 2012.

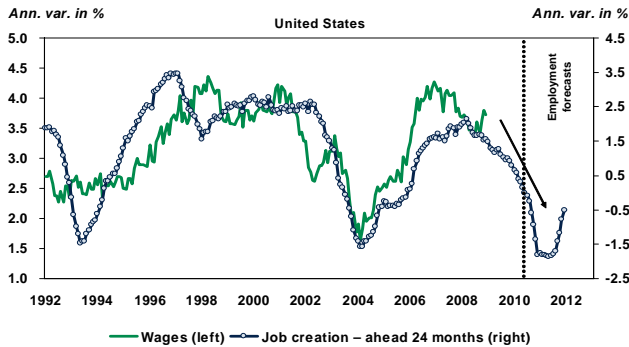
**Graph 11 – The American output gap will reach record proportions**



Sources: Bureau of Economic Analysis and Desjardins, Economic Studies

Under these circumstances, the hiring outlook remains grim and the latent effects of massive job losses will inevitably have repercussions for household incomes. Downside pressures on wage growth, whose effects are usually felt up to 24 months later, could in turn fuel a period of deflation in the next few years (graph 12).

**Graph 12 – Wage growth should slow further**

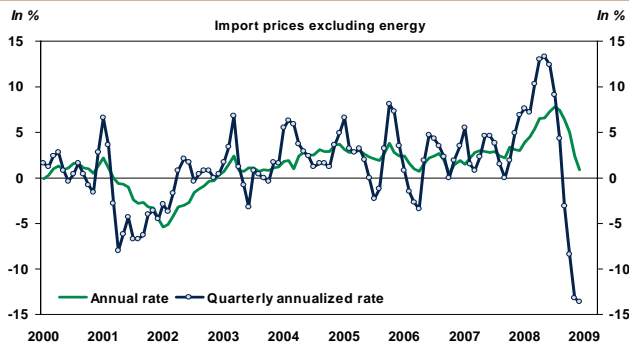


Sources: Datastream and Desjardins, Economic Studies

**IMPORT PRICES ARE DOWN SHARPLY**

In addition to local factors, we must also pay some attention to how prices for imported goods are evolving. A reflection of sagging American consumption, import prices excluding energy have plummeted in the last few months (graph 13). At this pace, the annual change is likely to go into negative territory shortly.

**Graph 13 – The drop in base import prices...**



Sources: Datastream and Desjardins, Economic Studies

The synchronization of the economic slump could aggravate this downward movement. In a context in which growth in Asian nations, especially China, was fuelled by American consumption, a drop in demand could translate into substantial overcapacity. In this environment, Asian economies will have to lower prices for their manufactured goods further (graph 14).

**Graph 14 – ...could steepen**

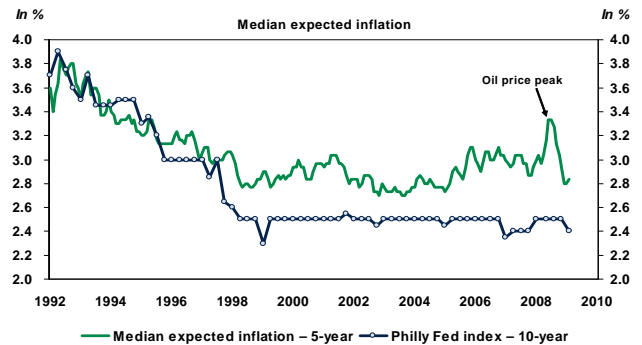


Sources: Datastream and Desjardins, Economic Studies

**INFLATION EXPECTATIONS**

The potential deflation scenario could be even worse if inflation expectations become unanchored. For now, most of the measures are still signalling that the Fed is doing what is necessary to maintain price stability. In particular, this is being reflected by the steady results for the survey of professional forecasters which remained anchored at 2.5% throughout the inflationary pressures underlying July 2008's surge by oil prices and remain so today, despite the economic downturn (graph 15).

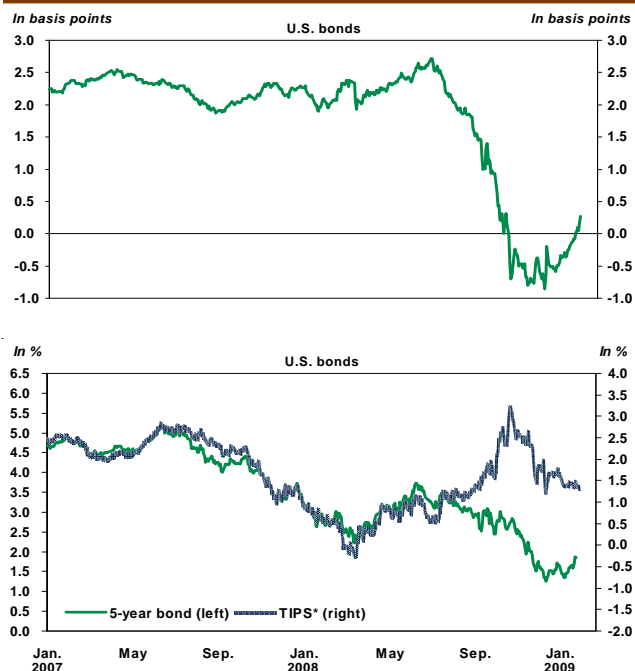
**Graph 15 – Surveys show that expected inflation is still well anchored**



Sources: University of Michigan, Federal Reserve of Philadelphia and Desjardins, Economic Studies

The inflation expectations derived from the gap between nominal bond rates and real return bond rates (real return bonds provide a hedge against inflation) corrected sharply at the end of 2008, but this partially reflects the problems associated with liquidity (graph 16).

**Graph 16 – The decline in inflation expectations primarily reflects market liquidity problems**



\* Treasury Inflation Protected Security.  
Sources: Datastream and Desjardins, Economic Studies

Still, the possibility of inflation that is below the Fed’s comfort zone will be a source of concern for the next few quarters:

“In light of the declines in the prices of energy [...] and the prospect for considerable economic slack [...] inflation pressures will remain subdued in the coming quarters. Moreover, the Committee sees some risk that inflation could persist for a time below rates that best foster economic growth and price stability in the longer term.”

Federal Reserve, January 28, 2009

**DEFLATION SPIRAL: THE FED TO THE RESCUE**

The combination of inflation expectations becoming unanchored and income stagnation could be a dangerous precedent for an inflation spiral. Given wages’ nominal rigidity, deflation drives real wages up. This further delays the employment cycle, prompting households to become even more cautious and revisit some purchasing decisions<sup>4</sup>. Sagging demand thus fuels a pernicious deflation cycle.

<sup>4</sup> It is this rigidity and its consequences during the Great Depression, which, according to the economist John M. Keynes, prompted the public sector to make a deficit to offset weakening private demand.

That said, although the aggravating factors are mounting, the conditions are not yet in place for deflation, properly speaking. By listing the events that are usually associated with this scourge, we can see that the Fed and the U.S. government have not repeated the errors that led to the Great Depression’s deflation period and to deflation in Japan in the 90s (table 1).

**Table 1**  
**Current deflation factors**

|                                      | Japan | United States |      |
|--------------------------------------|-------|---------------|------|
|                                      |       | 1930          | 2008 |
| Weakening of internal economy        | x     | x             | x    |
| Corporate overinvestment             | x     | x             | x    |
| Swelling of financial bubble         | x     | x             | x    |
| Growing debt level of private sector | x     | x             | x    |
| Strong comp. pressures on prices     | x     | x             | x    |
| Weakening of banking system          | x     | x             | x    |
| Rigid nature of monetary policy      | x     | x             |      |
| Unwavering fiscal policy             | x     | x             |      |
| Far-reaching structural problems     | x     | x             |      |
| Social and political paralysis       | x     | x             |      |
| Shrinking and ageing population      | x     |               |      |

x: means this variable has a potentially deflationary impact  
Source: Desjardins, Economic Studies

The government has instituted a plan that is essentially designed to recapitalize the American banking system; Congress has just passed a vast economic recovery plan. For its part, the Fed has not hesitated to take the target rate for federal funds to “zero”, and has added to its action through a massive expansion of its balance sheet to resolve strains in the credit market. Other facilities will be created as needed and, in the worst case scenario, the Fed will not hesitate to run the printing presses to buy back government debt, an operation that would be equivalent to injecting huge amounts of capital into the financial system.

**CONCLUSION**

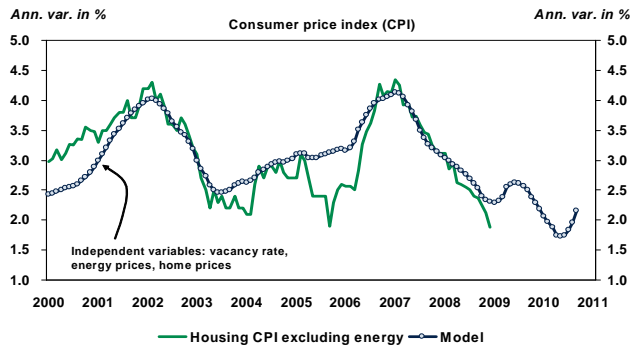
The risks of deflation have not been this extensive since the Great Depression of the 30s. In addition to the effects of the correction in energy prices, sagging private demand will keep sustained downward pressure on underlying inflation for the next few years.

However, we have solid hopes that the American economy will be able to avoid deflation, properly speaking. The deteriorating job market is a concern, but the economic recovery and job creation measures undertaken by the Obama administration should help turn the situation around in the second half of 2009.

Moreover, while the theoretical models based on the Phillips curve indicate a period of slight deflation, we believe it is more appropriate to capture the effects associated with the basic prices for goods and services separately from the effects associated with housing prices. It is then clear that stable inflation for housing costs (excluding energy), which account for almost 40% of the core index, offsets the downward pressure on other prices caused by the economic downturn (graphs 17 and 18).

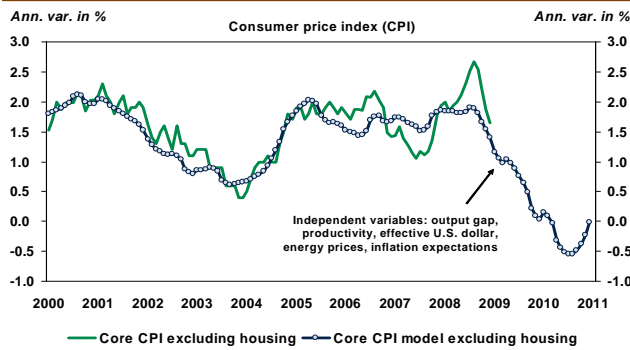
We thus project that core inflation will gradually moderate over the next few quarters, reaching a low of 0.5% toward mid-2010 (graph 19). At this level, however, we must be aware that the dividing line between sharp disinflation and deflation is a very thin one. Given that the downside risks to growth are dominant, a slight deflation scenario cannot be ruled out.

**Graph 17 – The increase in housing costs should offset...**



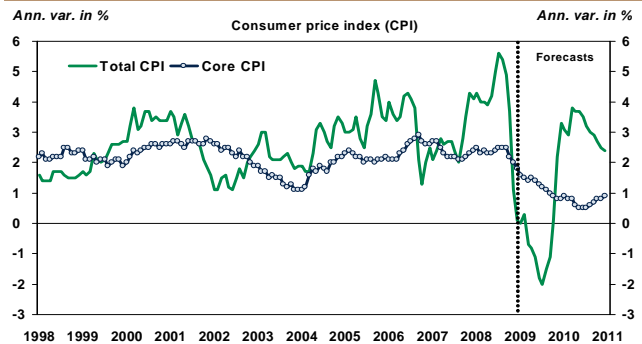
Sources: Datastream and Desjardins, Economic Studies

**Graph 18 – ...the drop in base prices for goods and services**



Sources: Datastream and Desjardins, Economic Studies

**Graph 19 – Core inflation will get dangerously close to negative territory**



Sources: Datastream and Desjardins, Economic Studies

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