Institute for Economic and Enterprise Research

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One aspect of the IEER ad hoc business climate research project is an attempt to examine the applicability of Google Insights for Search to study household consumption, the progress of retail sales turnover, and current car sales trends in Hungary. There have been several successful attempts to use Google data in a similar fashion, usually in connection with U.S. economic indicators. Our goal, however, is to analyse the consumption indicators based on Internet search traffic in a country where Internet penetration lags behind U.S. and Western European levels.

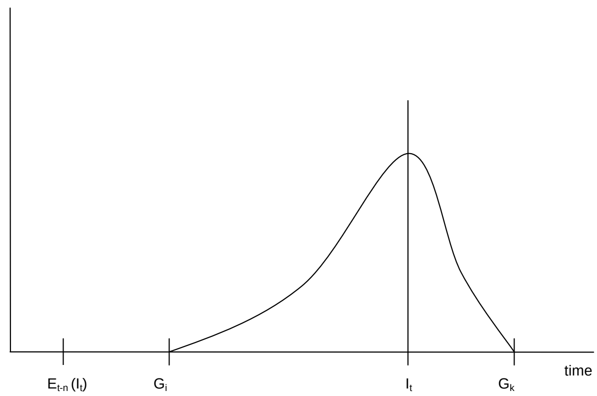
Our results show that Google can also be a useful tool for estimating present consumption patterns in a country where Internet use is less prevalent compared to developed countries. For retail and car sales, as well as household consumption, we found that the indicators based on Google performed well in providing trend estimates for the given reference time series.

The effect of information provided by Google on economic processes is based on the assumption that current or anticipated activity of consumers and entrepreneurs (for products or services online) is usually preceded by an Internet search procedure: economic stakeholders look for products, services and manufacturers, or make purchases via the Internet, and to this extent use Google. Of course, all this doesn't always result from a Google search transaction - but a positive relationship between the two factors can be assumed.

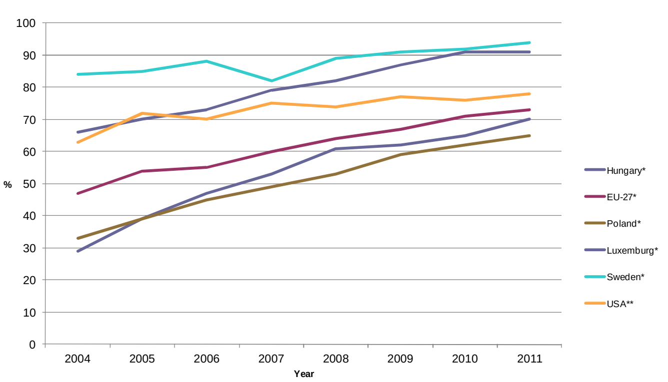
Google-based analysis have significant advantages over traditional questionnaire survey-based ones, since they can be prepared a few days following the relevant period (week, month, quarter) and its effectiveness can be quickly checked. In contrast, estimates based on questionnaire data recordings takes 2-3 weeks, and to calculate the total transactions of real indicators (e.g. retail sales, showing monthly consumption data) for any one period takes 30-40 days to complete. Despite these advantages, Google does not replace traditional methods (e.g., the projected behaviour of economic agents, and anticipated survey results) in the preparation of estimates, since it's more applicable for "nowcasting" (immediate or short term forecasts) as opposed to simple forecasting. On the other hand, it's necessary to exploit the opportunities offered by Google, because it provides very quick access to information.

In recent years, the number of research projects analyzing the suitability of Google data to estimate economic processes has grown rapidly. However, Internet penetration levels can seriously impact the accuracy of consumption forecasts based on Internet search trends. According to data from Eurostat, the proportion of Internet users compared to the total Hungarian population in 2011 was estimated at 70%. Along these lines, a continuous increase was observed in Internet use since 2004 when this rate was at just 29%. This rising trend of Internet users in 2011 is just below the European Union's 27 member state average of 73%, whereas in previous years there were serious gaps of more than 10%. However, Hungary is still lagging behind the Benelux and Scandinavian countries, where the proportion

Google search and expected / intended behaviour of economic agents



Internet Penetration Growth, 2004-2011



of Internet users is around 90% of the total population. As a result, it can be said that within the post-socialist countries of Europe Hungary belongs to the middle range in terms of Internet usage. It is important to take into account the prevalence of corporate web sites as well, since a web presence is essential for both production and service companies alike so that consumers can find them on the web. The IEER empirical study conducted in 2003 showed that of the 206 Hungarian export-oriented manufacturing companies surveyed 107 (57%) reported operating a website.

The data and estimation models

For our analysis we employ a data series generated using the Google Insights for Search (GIS) application, the GKI Economic Research Co. (GKI) consumer confidence index, automotive market information from Datahouse Ltd., and household consumption and retail turnover data series from the Central Statistics Office (CSO). Data from the GIS services is available from January 1, 2004 in weekly segments. This application allows you to search terms or categories, from which a time series of the search traffic is generated to present a chronological overview. For our analysis, data sets generated by specifying categories were used. When selecting categories we tried to cover all possible components related to that of private consumption. As a first step in the development of household consumption, the weekly data of expected clicks related to relevant categories were retrieved. In the second step, the data is transformed into monthly data, which are aggregated on a quarterly basis. In the third step, we selected those data sets collected from Google that showed a statistically significant correlation between the reference time series (the progress of household consumption expenditure).

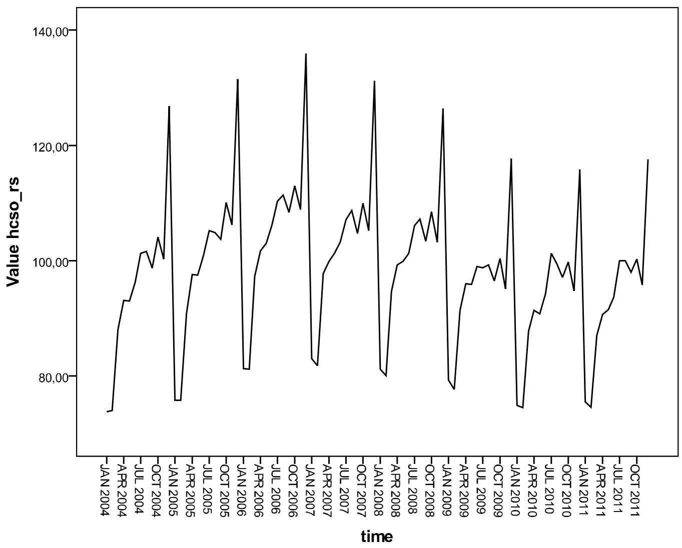
The usability of the Google data was determined by a time-series analysis using an accustomed strategy. With the assistance of a basic and an extended model, we examined whether information from Google contributes to a more accurate forecast of retail sales.

Retail sales

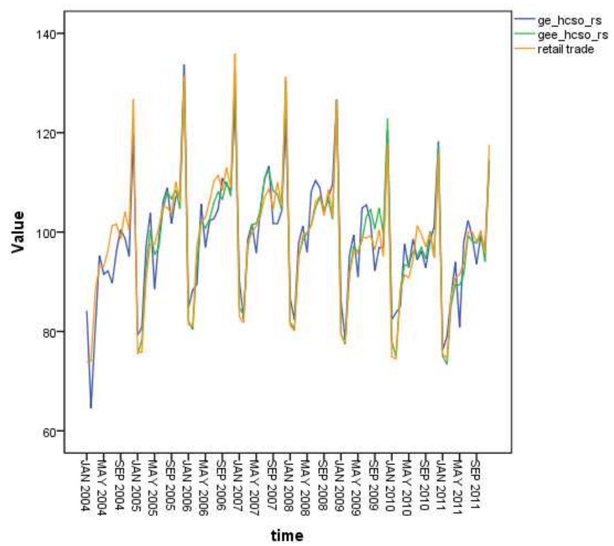
In the case of retail sales, calendar-adjusted volume indices also show a high degree of seasonality. In addition, the effect of the crisis can be observed -- after 2008 there was a significant decrease in retail sales in Hungary. The GIS selected search categories show a more or less uniform picture. Firstly, some seasonality can be observed while on the other hand the impact of the crisis can be clearly seen: after 2008 there were fewer hits in most categories.

According to the results, the effects of the Google based model are worse than the basic model; that is, it does not provide additional information. The outcome of the extended model forecast, however, suggests that the Google search

Retail trade in Hungary at 2005 constant price, (2004m1 – 2011m12, t= 96)



Retail trade and the estimated time series (2004m1 – 2011m12, t=96)



results ultimately contributed to the improvement of the accuracy of the forecast.

Car Sales

Car sales (turnover of new and used cars sales combined) showed a significant decline in 2008, and only since the third quarter of 2011 has there been some upward improvement. The GKI consumer confidence index more or less moved in tandem with the car sales time series until May 2009, but then diverged away from it.

According to the basic model, current month car sales have a strong impact on sales for the previous month and the previous year's sales figures as well. The results show that the information provided by Google provides a better forecast than the basic model, that is, it offers additional information. The outcome of the extended model suggests that the Google search results have contributed significantly to improving the accuracy of the forecast.

Household consumption

In Hungary, the time series pertaining to household consumption clearly shows the economic crisis: after the second quarter in 2008 a sharp decline can be observed until the third quarter of 2009, which was then followed by the stagnation of consumption levels. The GKI consumer confidence index time series is not in sync at all with the development of household consumption -- probably the sensitivity of the Hungarian population to political factors plays a role in this.

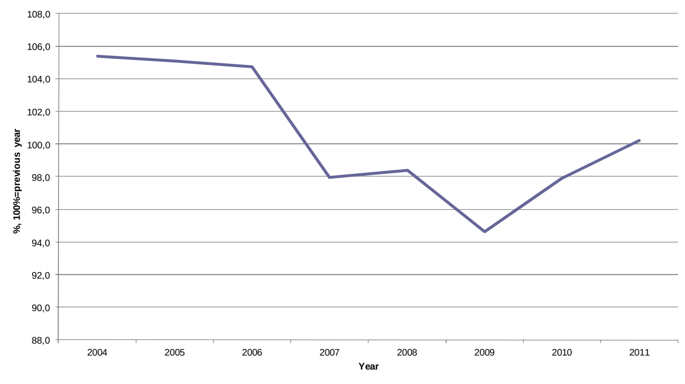
According to the basic model, household consumption of the previous period has a strong impact on consumption for the current quarter. The results show that the effect of the Google based model is less than the basic model, but is close to its performance.

Conclusions

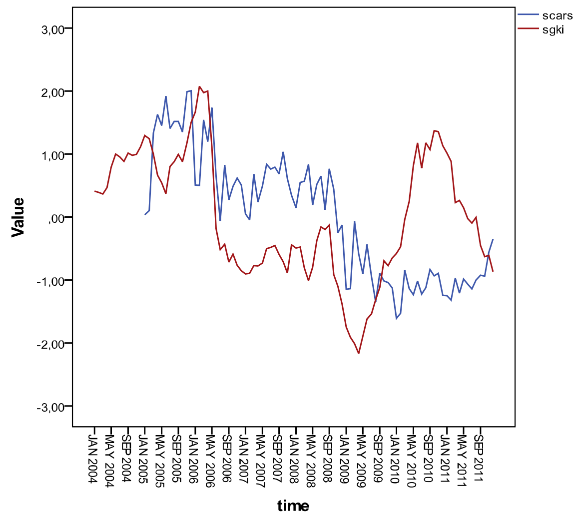
Calculations performed on Hungarian data show that information provided by Google alone is not enough, but taking into account other factors it can contribute to a more accurate forecast of household consumption and its various segments. In terms of retail sales turnover and household consumption, Google data alone were not effective, but improved forecast accuracy. For car sales, the information from Google alone contributed significantly to a more accurate estimate.

The results indicate that it is worth experimenting with the data offered by Google -- taking into account different categories, and from these build aggregated components in different ways -- even in countries characterized by low Internet penetration. Data from questionnaire-based surveys, as well as incorporated macro indicators, should also be taken into account when forecasting consumption.

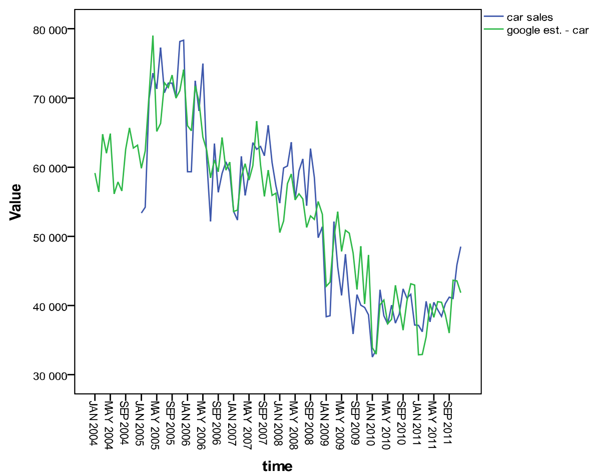
Volume index of total retail sales in Hungary, 2004-2011



Car sales and the GKI Consumer Confidence Index, standardized data, (2004m1 – 2011m12,



Car sales and estimated car sales by Google (2004m1 – 2011m12, t=96)



Macro-economic trends: the economic situation in Slovakia

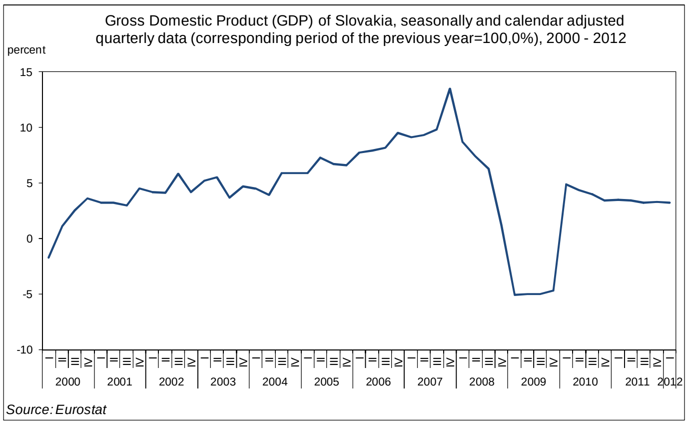
Throughout 2011, Slovak GDP grew by 3.3 percent, which is considered exceptional performance compared to the current state of other European economies. Although the economic slowdown in key partner countries has dampened the demand for Slovak exports, it was nevertheless the main source for continued GDP growth. The extremely good performance of the Slovak economy in the first quarter 2012 also surprised analysts. While several of the countries within the region sank into recession and the euro zone stagnated, Slovak GDP grew by 3 percent over the same period last year.

The new Slovak Prime Minister, Robert Fico, prepared to introduce significant restrictive economic measures. This is, first and foremost, the cessation of the flat tax (i.e. a tax increase). In addition, there are plans to increase the existing bank tax and to introduce a separate special tax. Other measures include reducing the state's contribution to the mandatory private pension system, while a luxury tax and dividend tax might also be introduced. Overall, 300 million EUR in revenue is expected this year and 1.5 billion next year from these measures, with which it is hoped that the government deficit will fall below the Maastricht limit of three percent.

Slovak economic analysts forecast 1.4 percent growth for this year, while the European Commission predicts growth of 1.8 percent. According to Ernst & Young analysts, however, the Slovak economy will slow down significantly in 2012 to 0.6 percent growth, primarily due to its dependence on exports. Still, they estimate that for the period from 2014 to 2016 economic growth will accelerate, averaging as much as 4.5 percent.

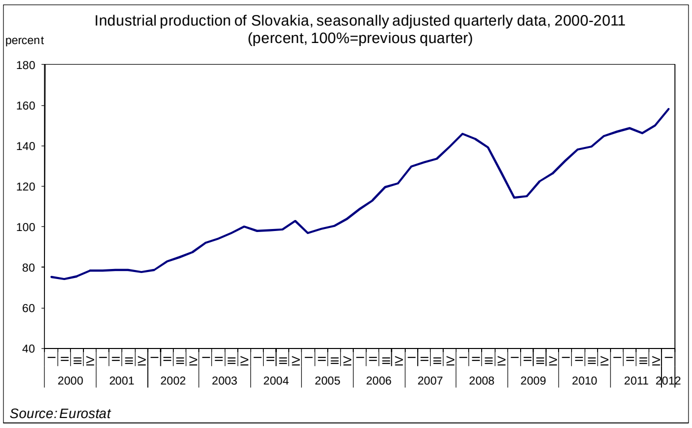
Economic Situation

In the last quarter of 2011 the gross domestic product of Slovakia showed an annual growth rate of 3.4 percent, which was 0.3 percentage points lower than the last quarter of 2010. Compared quarterly, however, the pace of GDP growth picked up in the last quarter of 2011 and was 0.9 percent higher than the third quarter. For all of 2011 the economy grew by 3.3 percent, which is exceptional performance compared to other European economies – given the fact that an economic slowdown in key partner countries reduced the demand for Slovak exports. Despite this, in the last quarter of 2011 exports of goods and services increased to 7.5 percent per annum (in the last quarter of 2010 this was 15.8 percent per annum), while at the same time there was a one percent drop in import volumes. Thus, exports remain the main source of GDP growth.



Source: Eurostat

The extremely good performance of Slovakia's economy in the first quarter of 2012 surprised analysts. While the economies of other countries in the region such as Hungary, the Czech Republic, and Romania slipped into recession, and overall in the euro zone there was stagnation, the Slovak gross domestic product grew by 3 percent over the same period last year. In the first three months, the economy expanded 0.7 percent compared to the previous quarter. The highest growth rate (35.9 percent) was attributed to industry, but the transportation and tourism segments (18.5 percent) also played a significant role, as well as public administration, education and health care (12.9 percent).



Source: Eurostat

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Exports of goods and services rose 2.6 percent year on year (16.8 percent in the first quarter of 2011). Imports fell 1.3 percent in the first quarter of this year.

The growth of the Slovak economy can be seen in the increase in employment figures as well. According to data from the statistical office, there was a 0.6 percent increase in the number of employees in the first quarter compared to the same period last year.

The new government's measures

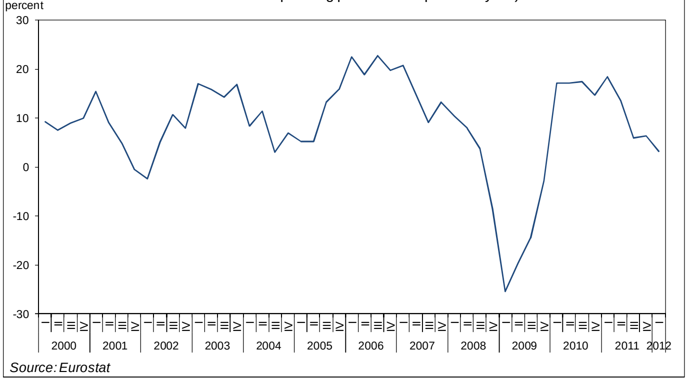
The previous government led by Radicová accomplished about 1.7 billion Euros in savings in 2011 and, as a result, the deficit in terms of GDP fell to 4.6 percent from 8.1 percent in 2010. This year, however, due to early elections, austerity packages were not announced, thus the deficit will not shrink further unless the new government introduces a new austerity package. According to analysts, for the deficit to fall to 3 percent of GDP by 2013 1 to 1.3 billion Euros in additional savings needs to be achieved.

The new prime minister, Robert Fico, already before the parliamentary elections indicated that he planned tax increases and to eliminate the flat tax. Previously, the main tax rate was19 percent in Slovakia – and the country was the first in the region to introduce a flat tax -- and the VAT was raised to 20 percent last year. The new, two-rate system would introduce a 22 or 23 percent tax rate on companies with an annual profit of over EUR 33 million, while income tax would be 25 percent for individuals with an annual income of more than 33 thousand Euros per year. Other sources speculate a higher tax rate for companies with over 30 million Euros in annual profit. The government expects 366 million in extra revenue from the proposed tax rates next year.

Robert Fico stated repeatedly and emphatically that he agrees with the austerity and stabilization measures adopted by the European Union, and therefore, unlike the previous government cycle, he now appears committed to introducing restrictive measures. These steps are expected to more negatively affect the business and corporate sector, which in turn may reduce the long term competitiveness of Slovakia.

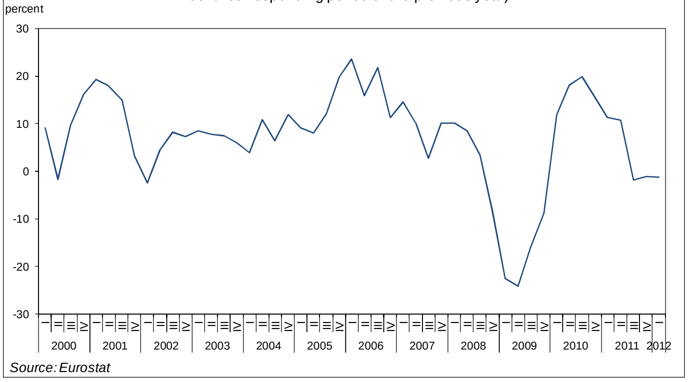
Among the austerity measures aimed at fiscal consolidation, increasing the bank tax introduced earlier plays an important role, in which the rate - proportionally - could reach record levels in Europe, as in Hungary. Fico justifies these measures by pointing to the need to consolidate public spending as well as the record revenues earned by banks in Slovakia in recent years. The government expects 100 million in revenue from the bank tax as early as next year. In addition the Slovak Prime Minister announced a one-time special bank tax at the end of May in which nearly 50 million in additional revenue is expected by the Slovak government.

Slovak export volume, seasonally adjusted quarterly data, 2000-2012 percent, 100%=corresponding period of the previous year)



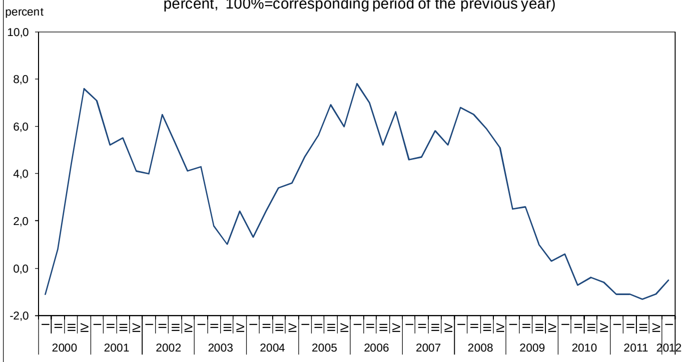
Source: Eurostat

Slovak import volume, seasonally adjusted quarterly data, 2000-2012 percent, 100%=corresponding period of the previous year)



Source: Eurostat

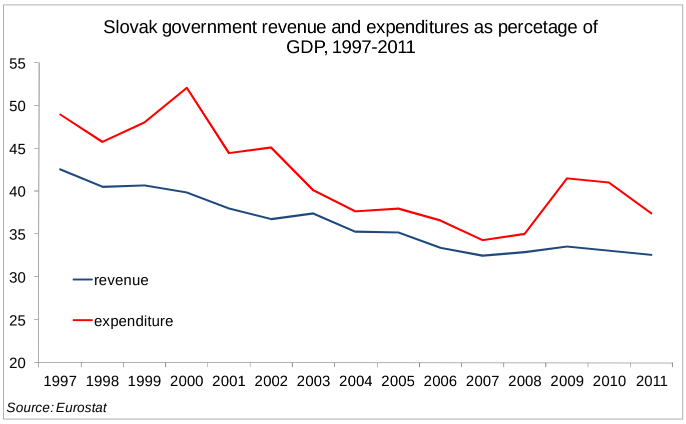
Slovak household consumption, seasonally adjusted quarterly data, 2000-2012 percent, 100%=corresponding period of the previous year)



Source: Eurostat

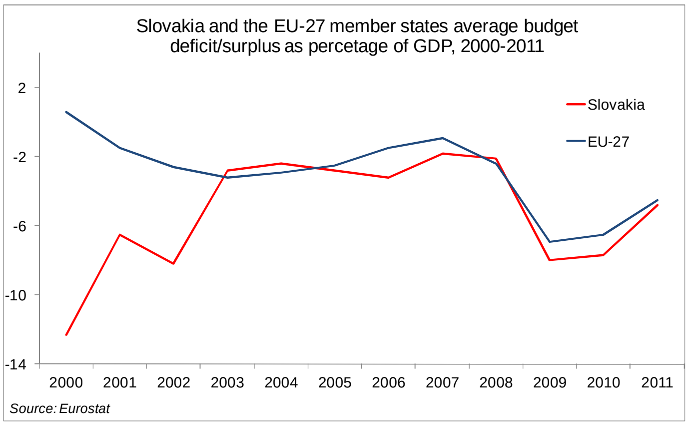
In addition, there is talk of a kind of luxury tax, as well as a 5 percent tax imposed on company dividends paid to individuals. The new government also supports the introduction of the so-called Tobin tax on international financial transfers as well. Other measures include reducing the state's contribution to the mandatory private pension system (nine percent of the contributor's pay is transferred to a private pension account, while nine percent goes to the state in the form of an employer's social security contribution).

These measures are expected to yield about 300 million Euros in total revenue this year and.5 billion next year, which will reduce the budget deficit in 2012 to 4.6 percent of GDP, allowing them after to push it below the three per cent Maastricht limit.

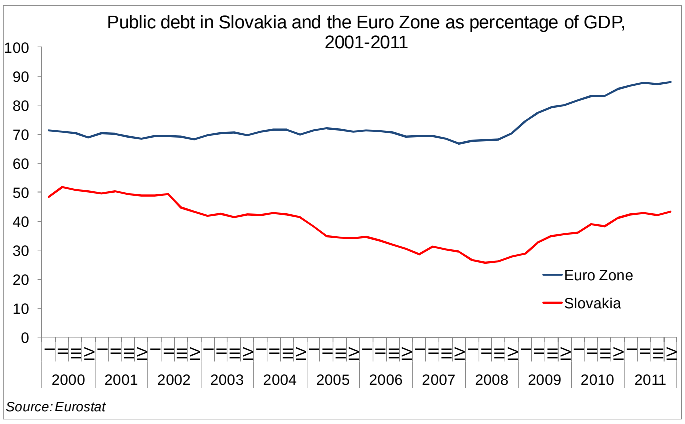


Expected economic situation

Previously, Slovak economic analysts expected up to 1.5 percent annual growth for the first quarter in 2012. In light of recent data, however, an overall 1.4 percent growth is forecast for this year. The Commission, however, is even more optimistic as it projected 1.8 percent growth for Slovakia in its last forecast, while for the euro zone as a whole it expects a 0.3 percent drop.



However, the international rating agency, Moody's, estimates that the Slovak GDP growth rate will slow down in future. The agency estimated 1.7 percent economic growth for Slovakia in 2012. Moody's downgraded this assessment at the end of March 2012 and the outlook for the Slovak banking sector from stable to negative, and justified this move because of its economic growth prospects and the quality of the banking system's assets. The agency believes that because of the slowdown in economic growth within the European Union, the business environment in Slovakia will weaken, which will reduce the profitability of banks. Moody's regards the Slovak banking system's expected liquidity and capital strength to be adequate.



Analysts from Ernst & Young see a significant slowing in the growth of Slovak economy in 2012. While in 2011 economic growth was 3 percent, the consulting firm feels it will decline to 0.6 percent this year– this mainly due to its dependence on exports. The firm, however, expects that for the period from 2014 to 2016 economic growth will accelerate, and on average could reach 4.5 percent. The firm forecasts that exports in 2012 will fall by 1.7 percent because of the European debt crisis and its significant impact on demand for Slovakia's most important export articles (cars, electronic equipment). Ernst & Young feels that the manufacturing sector will decline significantly, with the situation expected to be most critical in the automotive industry. Because of a drop in orders, companies will postpone investments in machinery and equipment until the outlook for the region does not improve. This attitude will affect other industries as well: the construction industry in 2012 will probably perform poorly again. Analysts said the outlook is more difficult because of the threat of a European credit crunch. Liquidity prospects in the euro zone and doubts arising from EU conditions restricting access to funds will definitely put a lot of pressure on banks. It is likely that many of them will reduce the sources of funding for their East European subsidiaries. The credit crisis may seriously affect the local banking sector in Slovakia due to its strong international presence. Ernst & Young believes that companies will not recruit new staff until demand increases. The consulting firm forecasts that unemployment in 2012 could reach 16 percent, up from 13.5 percent in the fourth quarter of 2011. These developments will limit consumption over the next two years. The deterioration in the outlook for private consumption is likely to lead to a decline in real wages, which has long been a cause of high inflation.

Source: index.hu, inforadio.hu, napi.hu

International trends

The Ifo Index, Germany's industry and trade confidence index of the Institute for Economic Research in Munich, showed a rise in value again in April 2012. The current business situation assessment improved slightly compared to March, while expectations for the near future are unchanged. According to the IEER asynchrony index, the Ifo business confidence index points to less uncertainty than in the previous month. Researchers feel that the German economy proved to be flexibly adaptable.
The April survey results from the French statistical office (INSEE) show that French business climate deteriorated. The business confidence index based on the accumulated opinion of business leaders fell three points and remains below its long-term average. The economic turning point indicator still indicates an unfavourable situation. The overall outlook index is unchanged and remains below its long-term average.

Germany (Ifo)

The Ifo Business Climate Index for industry and trade in Germany rose once more in April. Companies' assessment of their current business situation improved somewhat on a high level, while their six-month business outlook remained unchanged from last month. The German economy is proving resilient.

Measuring the gap between the business situation and expected developments, the asynchrony index calculated by IEER declined in April, thus the business confidence index showed a lower level of uncertainty compared to last month.

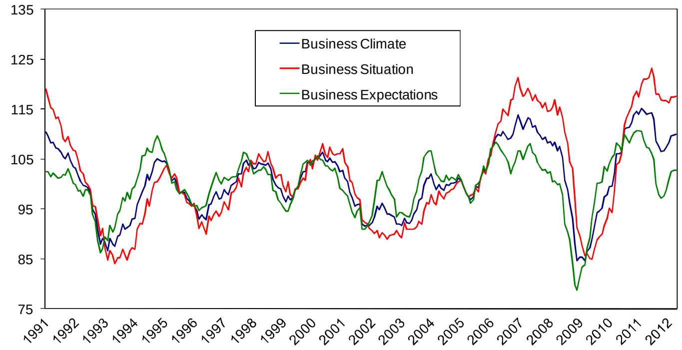
The business climate in manufacturing improved again on the previous month. The manufacturers surveyed see both their current business situation and their business outlook as significantly more positive. Manufacturers are increasing their capacity utilization. Their recruitment plans are slightly more conservative than last month.

The business climate developed differently at both levels of trade. While the business climate indicator increased minimally in retailing, it fell slightly in wholesaling. Climate components also developed in opposite directions. Retailers report some deterioration in their business situation and an improvement in their business outlook. A greater number of wholesalers, on the other hand, are satisfied with their current business situation, while their expectations clouded over slightly.

In construction the business climate was bleaker. The constructors surveyed report a slight deterioration in their current business situation. They are also no longer as optimistic about their future business development as last month.

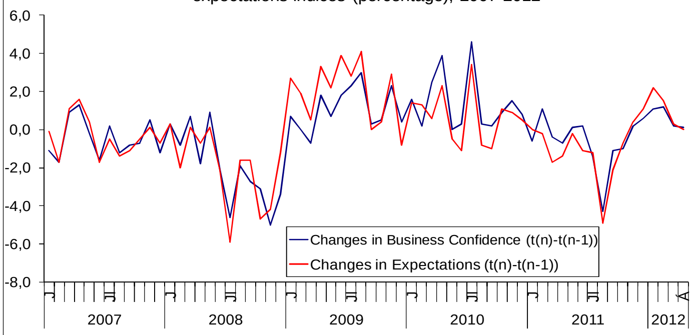
Source: Ifo (http://www.cesifo-group.de)

The Ifo Business Climate Index for German trade and industry, 2000=100%, January1991 - April 2012



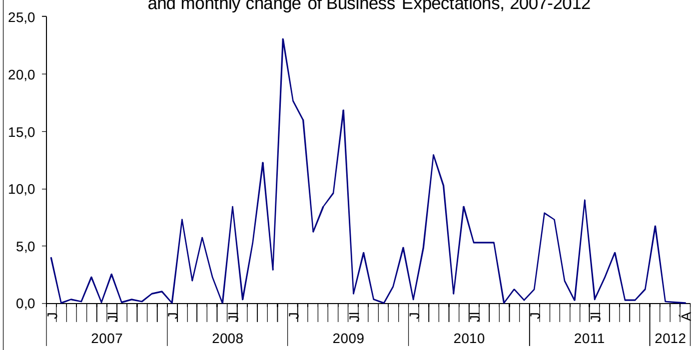
Source: www.cesifo.de

Monthly changes to the Ifo business confidence and business expectations indices (percentage), 2007-2012



Source: calculations based on data from http://www.cesifo.de

Index of Asynchrony between monthly change of Business Situation and monthly change of Business Expectations, 2007-2012



Source: calculations based on data from http://www.cesifo.de

France (INSEE)

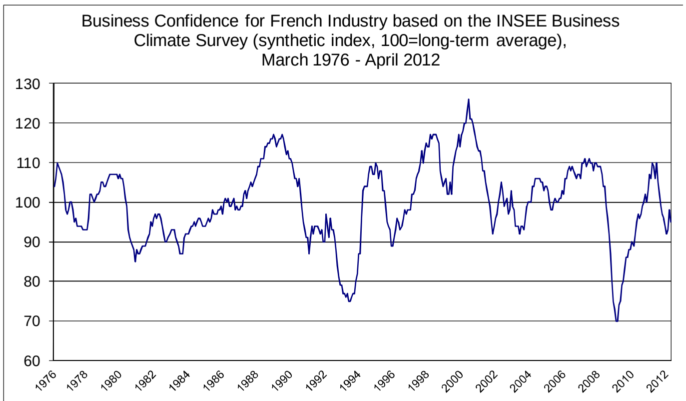
Based on a survey by the French statistical office (INSEE), in the opinion of French business leaders interviewed in April the business climate in France deteriorated compared to last month: the INSEE business confidence index fell three points and remains below its long-term average.

The economic turning point indicator has moved to the uncertain economic situation zone.

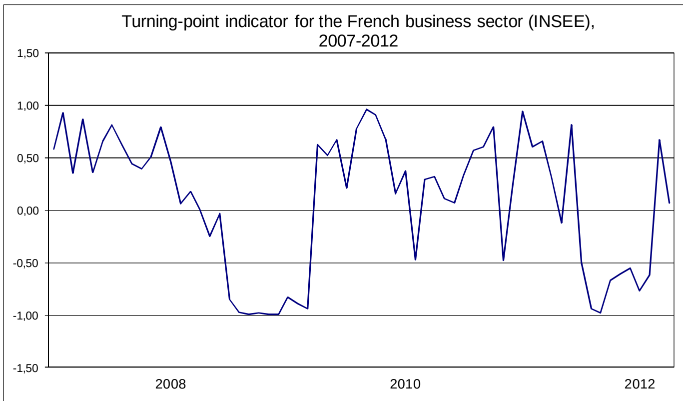
Business leaders view output from the previous period to have slightly increased in April, but it still can be considered to be at a low value. Company managers consider stocks of finished products to have stabilised at below average levels. The total stock orders index fell slightly and continues to remain at a low level. The export orders index fell significantly and the balance is below its long-term average.

French economic growth in the coming months is expected to lose momentum: the individual business operations forecast of company executives (which summarizes the business prospects of the coming months) deteriorated significantly in April compared with the previous month. The general business outlook index -- which reflects the sum of opinions related to the business activity of respondents – did not change compared to last month and still remains below its long-term average.

Source: INSEE (http://www.insee.fr)



Source: www.insee.fr



Source: www.insee.fr

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