



Special Report

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ECONOMIC RESEARCH

BMO Capital Markets

Gauging Provincial Economic Growth

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The provincial economies are mustering positive momentum, as Canada's overall recovery picks up. However, as was the case during the downturn, relative performance is poised to vary depending on each province's exposure to such things as natural resources and U.S.-bound exports. Unfortunately, Statistics Canada's data on provincial GDP are available only annually, and Ontario is the only province to publish its own quarterly data. Consequently, we are forced to sift through the assortment of higher frequency data for indications on provincial GDP growth. **We introduce BMO Capital Market's Provincial Economic Momentum Index (PEMI), designed to convert this myriad of metrics into one convenient**

indicator for each province.

Our methodology (see Appendix I) is similar to that employed by the Federal Reserve Bank of Chicago for their National Activity Index. We include 35 different provincial time series, mostly covering three broad areas: (1) business sales (manufacturing, wholesale, retail and international trade); (2) labour markets, and (3) housing and construction. The complete list is displayed and discussed in Appendix II. From this comprehensive set of data, we extract a single figure, or index, which best captures the co-movements of all the data. **One can think of this index as the largest common factor in the growth rates of all 35 provincial economic indicators, and a barometer of provincial GDP growth.**

By construction, when each of the 35 variables is growing at its average or trend rate, the index will take on a value of exactly zero—which also means that provincial GDP is growing close to its trend rate. A positive index value suggests above-trend growth and a negative reading points to below-trend growth. Technically, **the value of the index is interpreted as the number of standard deviations the province's economic activity is above or below trend.**

CHART 1
PEMI VS. GDP, ROUND 1
Canada

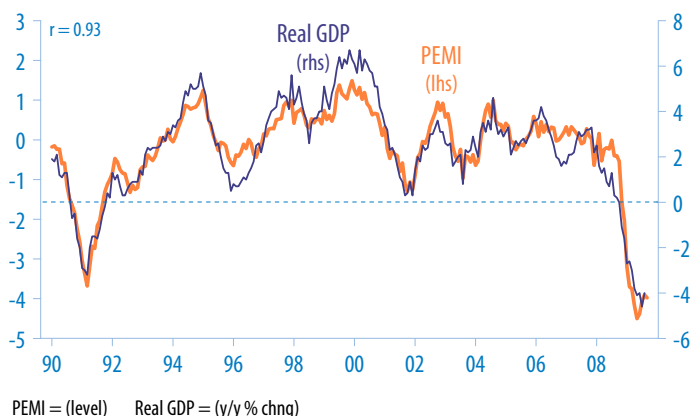


CHART 2
PEMI VS. GDP, ROUND 2
Ontario

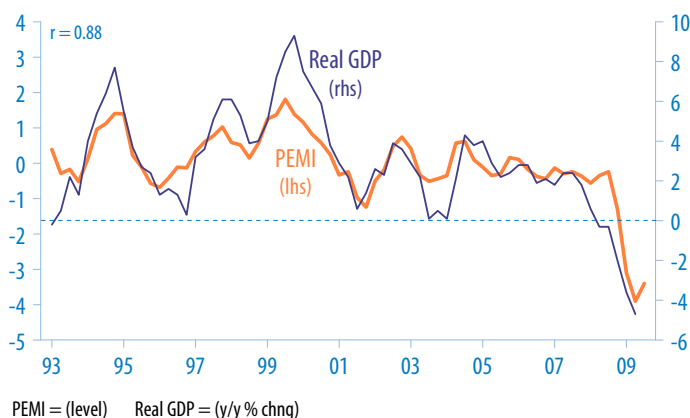


CHART 3
WESTERN CANADA

(level : 3-mnth m.a.)

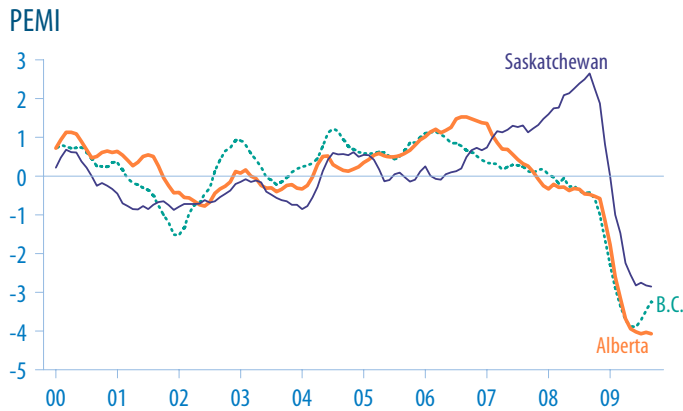


CHART 4
CENTRAL CANADA

(level : 3-mnth m.a.)

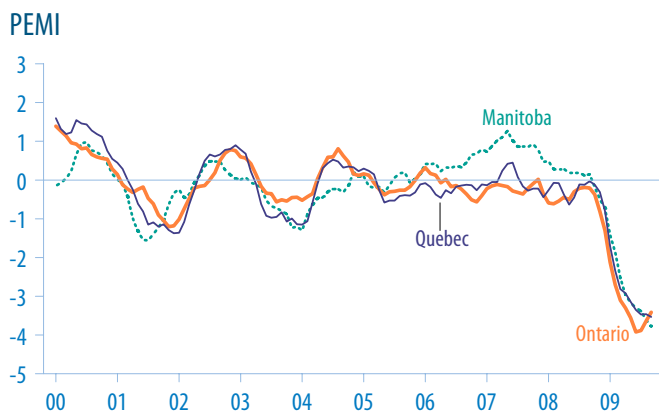
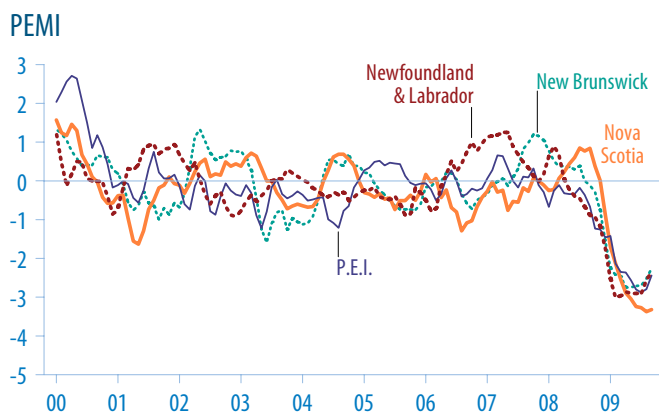


CHART 5
ATLANTIC CANADA

(level : 3-mnth m.a.)



To prove that PEMI is a good proxy for GDP growth, we construct an index for Canada (using the same methodology) and compare it to Statistics Canada’s monthly GDP data (*Chart 1*). Since 1990, there has been a very strong 0.93 correlation between the two series. By construction, PEMI is an indicator of year-on-year growth, not month-to-month or quarter-over-quarter. As such, it is not a concurrent indicator of recession or recovery. However, since recessions invariably eventually involve GDP slipping below year-ago levels, a PEMI reading of around -1.5 appears to be a (lagging) indicator of recession. To further show that the index is a reliable proxy for provincial GDP growth, we compare Ontario’s PEMI to the province’s quarterly GDP data (*Chart 2*). Here, we find another strong 0.88 correlation between the two series.

The PEMIs for each of the 10 provinces are shown in Charts 3 to 5. Comparing index levels shows the degree to which one province deviates from trend growth more than another province. However, **index levels do not translate directly into relative rankings of GDP growth because trend growth rates differ across the regions** (*Chart 6*). For example, since 1992, real GDP has grown at a 4% annualized rate in Alberta, while Nova Scotia has seen growth of just 2.2% per year. Therefore, if both provinces register PEMI levels of zero, it implies that both are growing at their trend rate—that is, Alberta is still growing faster than Nova Scotia.

Importantly, because the units of measurement are the same, **the ranking of changes in index levels does translate directly into a relative ranking of GDP growth changes, or economic momentum** (*Chart 7*). Currently, 5 of 10 provinces boast improving economic activity. Among the provinces with the largest PEMI improvements through September, British Columbia (where a remarkable housing market rebound has taken hold) is

CHART 6
TRENDS AMONG FRIENDS
 (annualized % chng, 1992-2008)

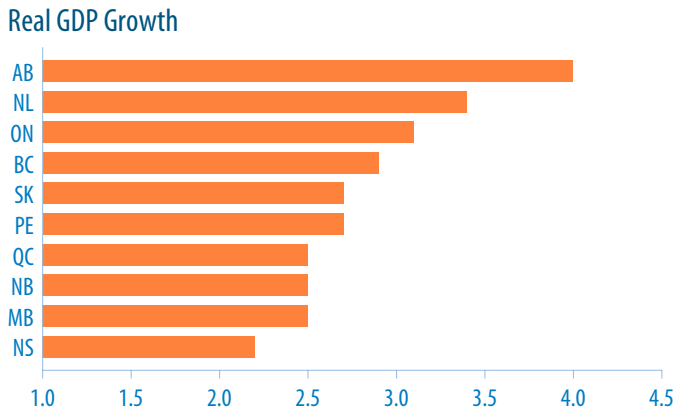
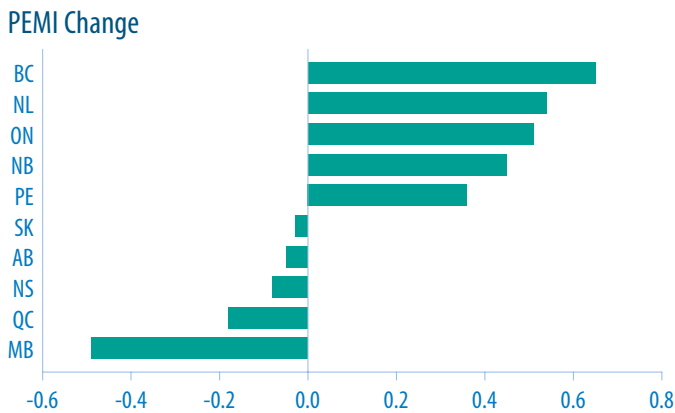


CHART 7
SHOWING MOMENTUM
 September 2009 (3-mnth average)



followed by Newfoundland & Labrador (which has seen a bounce-back in employment) and Ontario (which has been helped by rekindled auto production).

The PEMIs will be published once complete data are available, typically around 60 days after the end of the reference month. However, because partial data will also be available for the next reference month, a preliminary PEMI will be published for this month. As such, PEMIs are subject to revisions as data for the incomplete month are acquired and the underpinning provincial time series are revised.

The Bottom Line: Given the varying economic make-up of Canada’s provinces, growth trends often differ substantially across the country. The Provincial Economic Momentum Index converts a myriad of economic data into one simple indicator, allowing us to assess these differing trends in one quick glance.

Appendix I – Construction of the PEMI

The PEMIs are constructed using a statistical method called principal components analysis. The same method is employed by the Federal Reserve Bank of Chicago in constructing their National Activity Index (CFNAI), and both are based on original research conducted by James Stock (of Harvard) and Mark Watson (of Princeton) at the end of the 1990s.¹

In less-technical terms, we begin with a data set containing 35 monthly provincial time series. The data are transformed to be stationary, to remove the common trending feature in most economic time series. Normally, as in the CFNAI, this would involve taking the month-to-month percent changes or differences, but the move to sub-national data involves more volatile series, as does the use of data from increasingly smaller provincial economies. Furthermore, many published provincial time series are not seasonally adjusted. As such, we take year-over-year percent changes or differences to make the data stationary. The stationary data are then normalized to have a mean of zero and a standard deviation of one.

¹ Details of the CFNAI are available at: http://www.chicagofed.org/economic_research_and_data/cfna1.cfm

The first principal component of the normalized data is extracted. This is a technical procedure that produces a weighted average for each period, with the time-invariant weights derived to explain as much of the combined variation in the data as possible. The first principal component is re-normalized to have a mean of zero and a standard deviation of one—this is the raw index. The raw index, which is still quite volatile, is then smoothed out by taking a three-month moving average.

Appendix II – Data Selection

The PEMI draws on 35 different provincial time series, dating back to 1992, mostly covering three broad areas: (1) business sales, (2) labour markets, and (3) housing and construction. We ensure that the number of series in each area is comparable to avoid having one area over-influence the index. Sub-components of some of the time series are included when we judge that disaggregation can inform on relative provincial economic performance (one can go crazy with sub-components, but striving for balance limits their inclusion). Data choice is also constrained by availability.

List of Data

Business Sales

- Manufacturing sales, all industries
- Manufacturing sales, durable goods
- Exports, all sectors
- Exports, non-commodity sectors
- Imports, commodity sectors
- Retail sales, all trade groups
- New motor vehicle sales
- Manufacturing sales, nondurable goods
- Wholesale sales, total
- Exports, commodity sectors
- Imports, all sectors
- Imports, non-commodity sectors
- Retail sales, food and drinking places

Labour Market

- Employment, total
- Employment, full time
- Unemployment, total
- Average weekly hours worked
- Average weekly earnings
- Initial employment insurance claims
- Employment, private sector
- Employment rate
- Unemployment rate
- Average hourly wages
- Employment insurance beneficiaries, regular

Housing and Construction

- Value of building permits, total
- Value of building permits, residential
- Housing starts, single family
- Average MLS home price
- New house price index
- Value of building permits, non-residential
- Housing starts, total
- Housing starts, multi-family
- Existing MLS home sales

Other Indicators

- Consumer bankruptcies, total
- Population, total

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