# Official Business Sentiment Indicators for Tracking the Economy's Pulse and its Forewarning Capability

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## Abstract

This paper outlines two opinion surveys conducted by the Census and Statistics Department of Hong Kong to gauge the views of large enterprises (at quarterly interval) and small and medium-sized enterprises or SMEs in short (at monthly interval) on their current and expected business situation. The survey results for large enterprises could give early signals some three months prior to release of GDP statistics, while those for SMEs are released shortly after the reference month. The findings are useful to policy-makers and analysts in tracking the dynamics of the fast-changing economic landscape especially during the COVID-19 crisis. Empirically, the OLS regression models and likelihood ratio test suggested a statistical relationship between the diffusion indices (DI) derived from the surveys and GDP movements, which was more pronounced at economic turning points. This might be related to the capability of DIs to capture the fluctuations of business sentiment more readily during economic ups/downs. Nevertheless, care should be taken in interpreting the empirical results. Apart from the limitation of small datasets, DIs are simple sentiment indicators in nature as compared to GDP growth which embodies complex interplay of the macro-economy. Rather than looking at the DIs in isolation, other statistics and economic information should be referred to at the same time when assessing the economic situation.

**Keywords**: Diffusion index, GDP, business sentiment, turning point, COVID-19

## 1. Introduction

Apart from compiling key indicators such as Gross Domestic Product (GDP), Consumer Price Index (CPI), trade statistics, unemployment rate, and retail sales statistics which show the performance of the macro-economy, the Census and Statistics Department (C&SD) of Hong Kong has also been conducting two statistical surveys to obtain qualitative and forward-looking information for short-term economic assessment and detection of turning points. The overall and sectoral statistics derived from these surveys are useful for tracking the dynamics of the rapidly changing economy especially during economic shocks. Such information is crucial to timely formulation of targeted intervention measures such as those required under the COVID-19 pandemic. The main features and findings of the two surveys are outlined below. Also, the forewarning power of the derived sentiment indicators from these surveys would be evaluated.

## 2. Gauging business sentiment of large enterprises

The Quarterly Business Tendency Survey (QBTS) collects views on short-term business performance from the senior management of some 570 prominent establishments in ten selected sectors[1] to provide a quick assessment on the short-term economic outlook of the local economy. Specifically, views from the survey respondents on expected changes in a number of economic variables including business situation, volume of business/output, number of persons engaged and selling price/service charge, as well as on the present situation regarding level of orders-on-hand, profit, finance and access to credit are solicited. Qualitative information is collected from the respondents who provide their views[2] in three-option ordinal scales such as "Up/Same/Down". Key results of the survey are generally presented as "net balance", i.e. the difference between the percentage of establishments choosing "up" and that choosing "down". A positive net balance indicates a likely upward trend while a negative one indicates a likely downward trend.

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[1] The ten sectors are: manufacturing; construction; import/export trade and wholesale; retail; accommodation and food services; transportation,
  storage and courier services; information and communications; financing and insurance; real estate; and professional and business services.
[2] Respondents are requested to exclude the changes arising from normal seasonal variations in reporting their views.

The results of QBTS could provide valuable forward-looking information on business conditions in terms of giving early signals some three months prior to release of GDP statistics[3].   Overall, the business sentiment captured by QBTS has been able to forewarn the economic ups and downs in the crisis, as witnessed through its generally close movement with the overall trend of GDP growth (Chart 1).

Chart 1:          Net balance of views of large enterprises on expected changes in business situation in the reference quarter versus the preceding quarter from QBTS and GDP growth
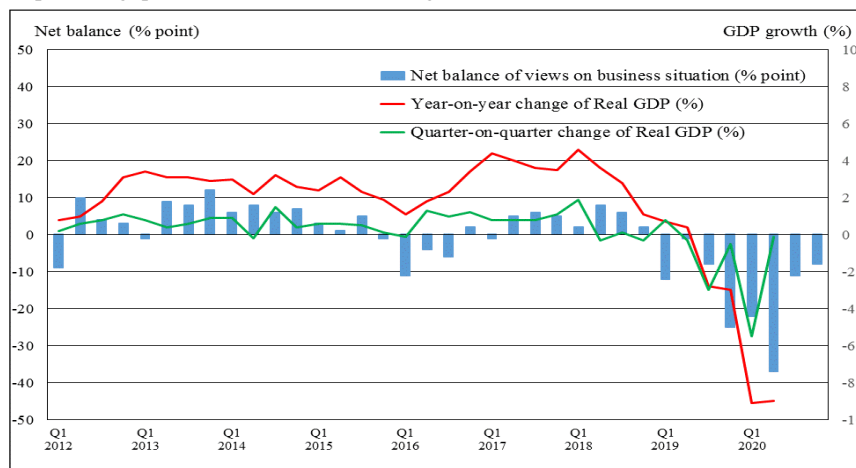


## 3.   Gauging business sentiment of small and medium-sized enterprises

In a similar vein, C&SD also conducts the Monthly Survey on the Business Situation of Small and Medium-sized Enterprises[4] (SME Survey) for assessing the business situation faced by SMEs.   The survey covers a panel sample of around 600 SMEs in seven selected sectors[5].   Views on the current and expected business situation in one month's time on business receipts and new orders, as well as views on the current situation on employment and access to credit are collected[6].   Respondents are offered similar choices of "Up/Same/Down" as in QBTS.   Based on the views collected, a set of current and one-month's ahead outlook diffusion indices[7] (DI) is compiled, summarising whether the business is expanding (DI > 50), staying the same (DI = 50), or contracting (DI < 50).

With survey results available shortly after the reference month, the SME Survey has the merits of reflecting the current state of play faced by SMEs (i.e. current DI) and providing advance signal of changes in economic activities (i.e. outlook DI).   This is particularly pertinent as SMEs are sensitive to economic fluctuations.   The trend of one-month's ahead outlook DI on business situation for SMEs also tracks the changes of GDP fairly well and could help detect turning points of the business cycles with more conspicuous peaks and troughs (Chart 2).

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[3]   Take QBTS for the second quarter of 2020 as an example, the results were released on 23.4.2021, whereas advance estimates on GDP will be released on 30.7.2021.

[4]   SMEs in the sectors covered refer to establishments with fewer than 50 persons engaged.

[5]   The seven sectors are wholesale trade; retail trade; import and export trades; restaurants; logistics; real estate; and business services.

[6]   Respondents are requested to exclude the changes arising from normal seasonal variations in reporting their views.

[7]   DI is computed by adding the percentage of SMEs reporting "up" in the category concerned (e.g. business receipts and employment) to one half of the percentage of SMEs reporting "same".   The current DI reflects the current business situation as compared with the preceding month and the outlook DI reflects the expected business situation in one month's time as compared with the current situation.

Chart 2:      Outlook diffusion index (DI) on business receipts of SMEs and GDP growth
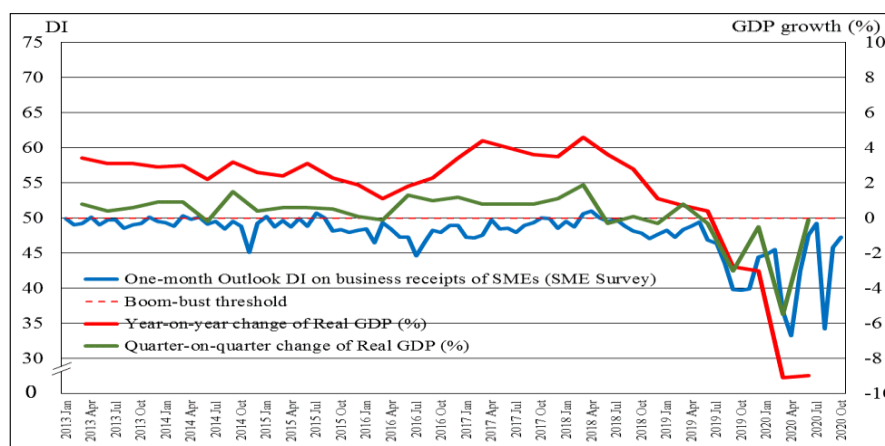


## 4. Combined findings

The key findings from the two surveys for large enterprises (transformed to DIs) and SMEs are presented in Chart 3.   In the past decade or so, the DIs on business situation of large enterprises generally stayed above the 50-threshold and were higher than the DIs on business receipts of SMEs, except for periods of serious shocks.   This might be attributable to their stronger financial capability and resilience power. The overall DIs on business receipts of SMEs generally stayed below the 50-threshold, reflecting that SMEs were particularly fast reacting and more vulnerable to crises, as epitomised by the steep troughs in times of external and internal disturbances in recent years.

Chart 3:      Outlook DIs from SME Survey and QBTS
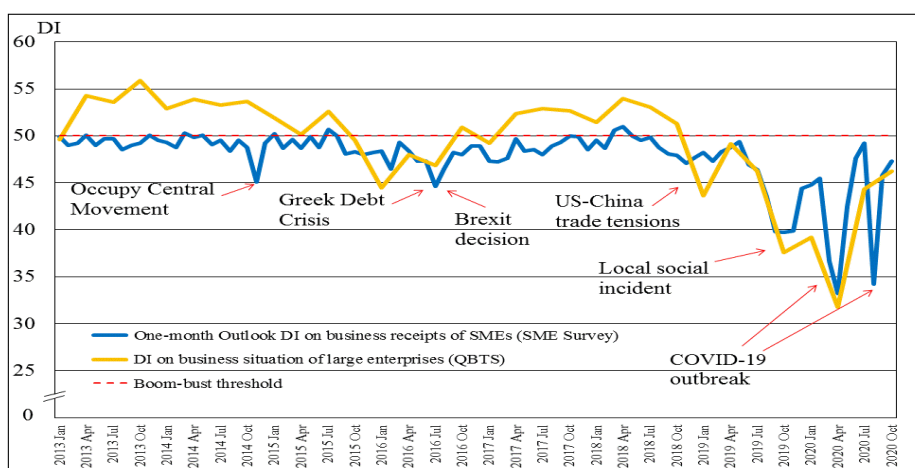


## 5. Assessing the power of sentiment indicators to forewarn GDP movement

While the DIs derived from the above surveys, namely, $DI_{QBTS}$ and $DI_{SME}$ could serve the analyses of its own accord, some preliminary tests regarding the power of these DIs to forewarn changes of GDP are highlighted below:

### OLS regression models

As a starting point, OLS regression models by regressing the YoY of real GDP on the DIs are fitted for different time periods with summary results shown in Table 1.

Table 1:      Summary results of OLS regression models

| Independent variable(s) | Data period: 2010Q3 – 2020Q4 | | | | | Data period : 2010Q3 – 2018Q4 (excl. 2019 and 2020) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Adj R$^2$ | t-value | P$_r$ > \|t\| | F-value | P$_r$ >F | Adj R$^2$ | t-value | P$_r$ > \|t\| | F-value | P$_r$ >F |
| $DI_{QBTS}$ | 0.7270 | 10.50 | <0.0001 | 110.18 | <0.0001 | 0.4685 | 5.49 | <0.0001 | 30.09 | <0.0001 |
| $DI_{SME}$ | 0.7723 | 11.83 | <0.0001 | 140.02 | <0.0001 | 0.1932 | 2.98 | 0.0054 | 8.90 | 0.0054 |
| $DI_{QBTS}$ $DI_{SME}$ | 0.8164 | 3.26 4.53 | 0.0023 <0.0001 | 92.16 | <0.0001 | 0.4515 | 4.01 0.09 | 0.0004 0.9327 | 14.58 | <0.0001 |

The results generally indicated a positive correlation of real GDP growth rate and that of $DI_{QBTS}$ and $DI_{SME}$ with all OLS models significant statistically at 5% level. The correlation was more noticeable for those models covering longer time span (i.e. including 2019 and 2020 during which Hong Kong experienced social and economic distress). That said, more vigorous tests (e.g. partial correlation coefficient validation, heteroscedasticity) are required to ascertain the relationship and possible bias (e.g. omitted variables bias).

Likelihood ratio test for DIs

The relationship between DI and GDP growth is further investigated by using Likelihood ratio test in comparing the following models with key results given in Table 2.

$$GDP_t = C_1 + GDP_{t-1} + DI_{QBTS,t} + DI_{SME,t} + \mu_t \quad \text{(Full Model)}$$
$$GDP_t = C_2 + GDP_{t-1} + \varepsilon_t \quad \text{(Reduced Model)}$$

Table 2:      Likelihood ratio test for GDP and DIs

| Data period    Null hypothesis: | Model 1: 2010Q3 – 2020Q4 | | Model 2: 2010Q3 – 2018Q4 (excl. 2019 and 2020) | |
|---|---|---|---|---|
| | F-value | $P_r$>F | F-value | $P_r$>F |
| Reduced Model is as good as Full Model | 10.6694 | 0.0002 | 1.0215 | 0.3727 |

The above results indicated that the null hypothesis that "Reduced Model is as good as Full Model" is rejected at significance level of 5% for Model 1 but not for Model 2. It shows that the forewarning capability of DIs is more pronounced around business cycle turning points. This is not difficult to understand as businesses are more sensitive to economic expansions or contractions and hence the DIs compiled from the opinion surveys could capture the oscillation of business sentiment more readily.

## 6. Discussion and conclusion

The economic sentiment indicators on current and expected business situation derived from the opinion surveys of large enterprises and SMEs could be seen as a valuable complement to quantitative statistics in terms of providing a timely signal on short-term economic changes. There are quite a number of studies on business cycle and early warning indicators, with different models ranging from the use of simple sentiment indicators to a compendium of variables. In this study, OLS regression models and Likelihood ratio test suggested that the statistical relationship between sentiment indicators on DIs and GDP movement was more pronounced at economic turning points. This might be related to the capability of DIs to capture the fluctuations of business sentiment more readily during economic ups /downs. Nevertheless, care should be taken in interpreting the empirical results. Apart from the limitation of small datasets, DIs are simple sentiment indicators in nature as compared to GDP growth which embodies complex interplay of the macro-economy. Rather than looking at the DIs in isolation, other statistics and economic information should be referred to at the same time when assessing the economic situation.

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