DEPARTMENT OF STATISTICS
M A L A Y S I A

UTILISING BUSINESS TENDENCY SURVEY RESULTS FOR GDP ESTIMATES

Economic Indicators Division

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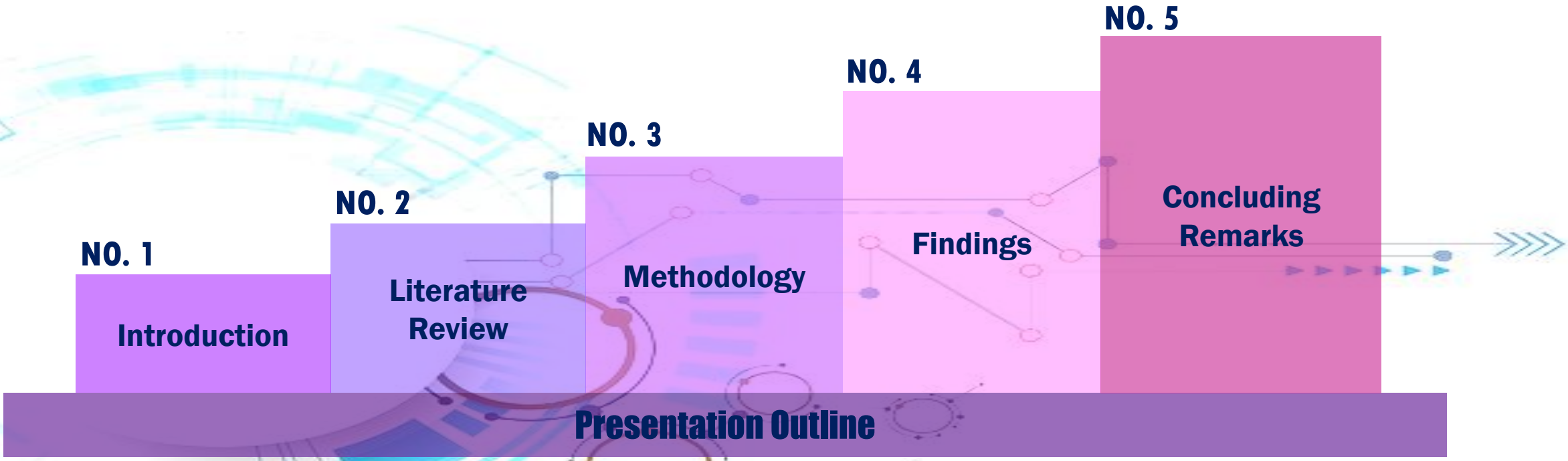
PRESENTATION OUTLINE



INTRODUCTION

- In the developed world the model tools for calculation Gross Domestic Product (GDP) estimates are based on quantitative time series data which include indicators that significantly determine GDP development

- Starting second quarter 2018, Economic Indicators Division (EID) is publishing Business Tendency Statistics

- Presents statistics on the business performance based on Business Tendency Survey (BTS)

- The information collected in BTS is described as qualitative

INTRODUCTION (CONT'D)

- Result of BTS is published in the form of net balance and confidence indicators (CI) conveying the expectations of economic entities over the next three months
- Confidence Indicator: short term indicator which summarize the overall view of business situation in various sectors in Malaysia
- The CI is computed as average of the net balance for selected variables
- As a result, they can be an important source of information for computing flash estimates or short-term predictors for the development of macroeconomic

LITERATURE REVIEW

i. Jan Haluska (2006)

-Present the methodological approach and econometric type model relationships that use economic sentiment indicator (ESI) to represent GDP development

-ESI can be considered a statistically significant indicator of GDP development and it may be used to construct model relationships for flash estimates of GDP

-The explanatory power differs as far as the past is concerned and that it is significantly higher for the ECM model

LITERATURE REVIEW (CONT'D)

ii. Annabelle Mourougane and Moreno Roma (2002)

- Investigate the usefulness of the European Commission confidence indicators (CI) in forecasting real GDP growth rates in the short-run in selected Euro area countries (Belgium, Spain, Germany, France, Italy and the Netherlands) which account for almost 90% of the euro area

- Estimate a linear relationship between real GDP and CI

- Compare the forecasting performance of the estimated models with a benchmark ARIMA model

- Generally CI can be useful in forecasting real GDP growth rates in the short run in Belgium, Germany, France, Italy and Netherlands

LITERATURE REVIEW (CONT'D)

iii. Vit Posta and Zdenek Pikhart (2012)

- Perform a quantitative analysis of the possibilities of Sentiment Economic Indicator based on the joint harmonized EU programme of business and consumer surveys to forecast quarterly GDP growths as a result of the publication lag of the data on GDP

- Construct ARMAX models in some augmented by the GARCH models to capture the relationship between quarterly changes in GDP and the Sentiment Economic Indicator

- Only some forecasting power models of the ARMAX/GARCH beat that of a simple ARMA model

LITERATURE REVIEW (CONT'D)

iv. Johanna Garnitz, Robert Lehman and Klaus Wohlrabe (2017)

-Use World Economic Survey (WES) conducted by the ifo Institute to forecast growth of GDP in 44 countries and three country aggregates separately

-35 countries as well as the three aggregates a model containing one of the major WES indicators produce on average lower forecast errors compared to an autoregressive benchmark model

-The most important WES indicators are either the economic climate or the expectations on future economic development for the next six months

-70% of all country-specific models contain WES information from at least one of the main trading partners. Thus, by allowing WES indicators from economic important partners to forecast GDP of the country under consideration, increase forecast accuracy

LITERATURE REVIEW (CONT'D)

v. Martina Karlsson and Helen Orselius (2014)

- Examine Swedish indicators and observe if they are stable, and provide accurate, reliable and consistent signals in relation to GDP growth

-Ten indicators within the categories financial, survey-based and real economy indicators are selected

-The statistical tests include Correlation, Cross-correlation and Simple Linear Regression, an interaction term is also included to account for financial crisis

-The results show that nine out of ten indicators are unstable. Purchasing Managers Index show largest changes compared to other indicators

- Industry Production Index is the best performing indicator

METHODOLOGY

- The parameters of the model relationships were estimated using OLS method. The original regression model is:

$$GDP_t = \alpha + \beta CI_t + \varepsilon_t$$

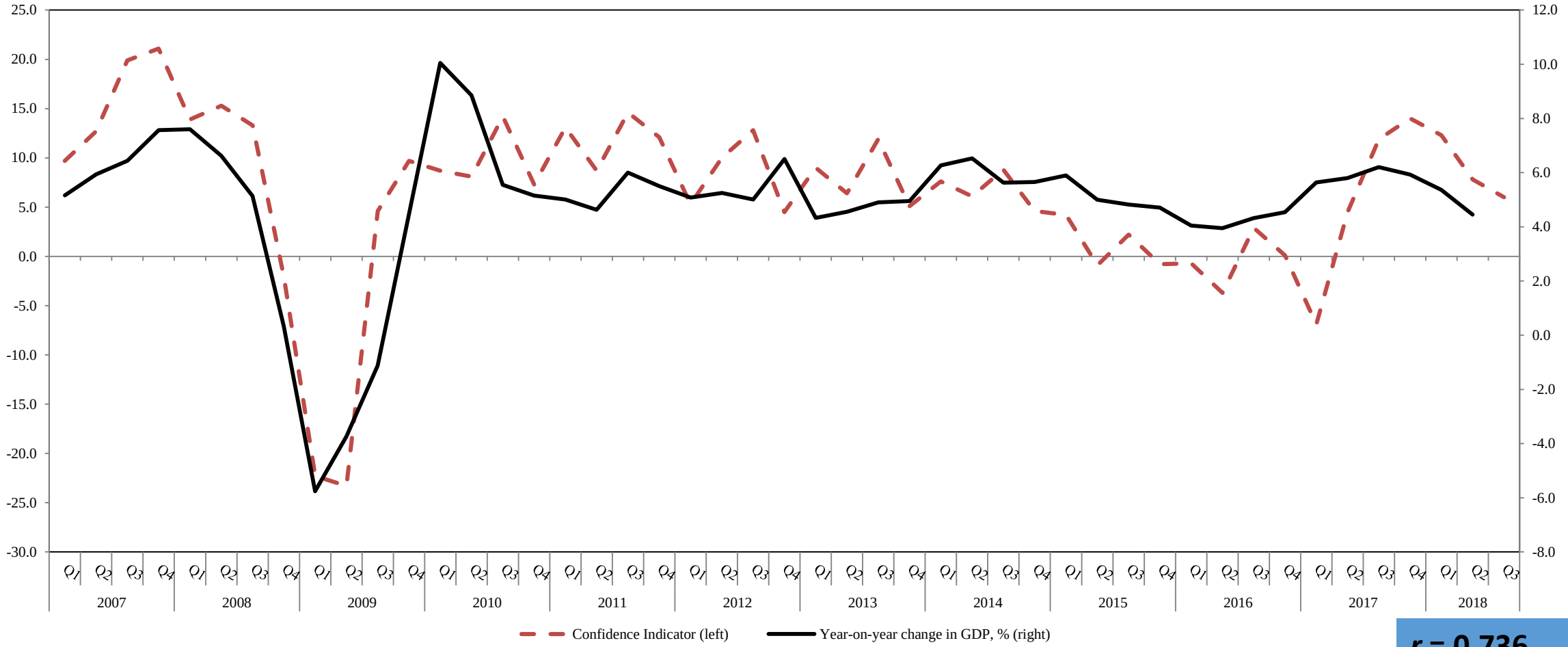
Where:

GDP = GDP annual growth
α = intercept
β = regression parameter
CI = confidence indicator
ε = the residuals of the regression equation

- The model was constructed using 46 quarterly time series of such indicators for a period of first quarter of 2007 to second quarter 2018.

FINDINGS AND DISCUSSION

Chart 1: GDP annual growth and Confidence Indicator



***r* = 0.736**

FINDINGS AND DISCUSSION (CONT'D)

The estimation of the parameters of the linearized regression equations using OLS method gives the following results:

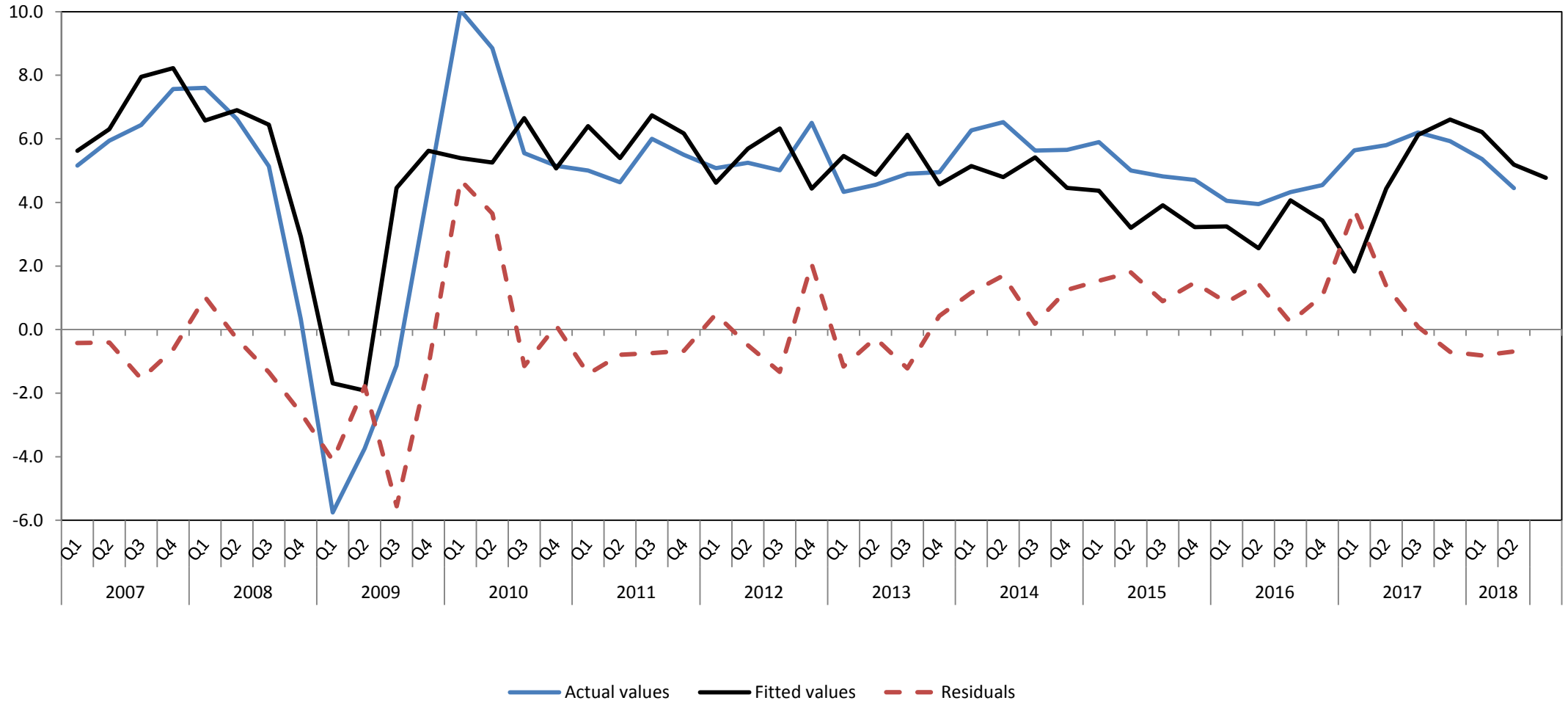
$$GDP = \underset{(0.0)}{3.4060} + \underset{(0.0)}{0.2284}\ CI$$

CI is statistically significant

Coefficient of determination	0.5399
Standard deviation of regression	1.8542
Durbin -Watson statistics	1.1005

FINDINGS AND DISCUSSION (CONT'D)

Chart 2: Actual Values of GDP, Fitted Values of GDP and Residuals



FINDINGS AND DISCUSSION (CONT'D)

➢ **Supplementing the basic models with a large set of variables**

FINDINGS AND DISCUSSION (CONT'D)

➢ **Supplementing the basic model with a lagged dependent variable**

$$GDP = \underset{(0.0)}{1.6543} + \underset{(0.0)}{0.1415}\ CI + \underset{(0.0)}{0.4735}\ GDP\ (-1)$$

CI is statistically significant

Coefficient of determination	0.6850
Standard deviation of regression	1.5683
Durbin -Watson statistics	1.3362

FINDINGS AND DISCUSSION (CONT'D)

➢ **Supplementing the basic model with a leading index**

$$GDP = \underset{(0.0)}{3.3168} + \underset{(0.0)}{0.1412}\ CI + \underset{(0.0)}{0.4557}\ LI$$

CI is statistically significant

Coefficient of determination	0.6209
Standard deviation of regression	1.7004
Durbin -Watson statistics	0.8834

FINDINGS AND DISCUSSION (CONT'D)

- **Supplementing the basic model with a growth of industrial production index**

$$GDP = \underset{(0.0)}{3.1477} + \underset{(0.0)}{0.1171}\ CI + \underset{(0.0)}{0.3960}\ IPI$$

CI is statistically significant

Coefficient of determination	0.9120
Standard deviation of regression	0.8193
Durbin -Watson statistics	1.6366

FINDINGS AND DISCUSSION (CONT'D)

➢ **Supplementing the basic model with all variables**

$$GDP = \underset{}{2.3313} + \underset{(0.0)}{0.070}\ CI + \underset{(0.0)}{0.1602}\ LI + \underset{(0.08)}{0.3145}\ IPI + \underset{(0.0)}{0.2276}\ GDP\ (-1)$$

Coefficient of determination	0.9318
Standard deviation of regression	0.7477
Durbin -Watson statistics	1.6123

CI is statistically significant

CONCLUDING REMAKS

- In general, the results of the business and consumer surveys may be effectively exploited by using them to construct an econometric model and used the model to estimate macroeconomic indicators

- The results presented in this study show that the CI can be considered a statistically significant indicator in estimating GDP annual growth

- Based on the findings, we found that their explanatory power differs for every estimated models

- A possible extension could be the estimation of GDP components using the CI for every sector

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