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# Manufacturing sector foreign direct investment and economic growth in South Africa

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**Abstract:** Foreign direct investment is recognized as a significant driver of economic development and growth in many economies. It can have a positive effect on a host country's development and growth efforts. This study seeks to determine the long-run relationship between manufacturing sector foreign direct investment and economic growth in South Africa in the period 2006–18. The study incorporates trade openness, domestic investment, inflation, and exchange rate as additional variables. To test for stationarity of the data, the Augmented Dickey–Fuller and Phillips–Perron tests are used. The empirical analysis is conducted using the autoregressive distributed lag model to examine the long-run relationship between the variables. The results suggest that manufacturing sector foreign direct investment has a negative impact on economic growth in the long run. The findings of this study imply that policy measures should be put in place to ensure adequate quality of labour and infrastructure development, in order that higher growth rates can be achieved in South Africa.

**Key words:** foreign direct investment (FDI), economic growth, manufacturing sector FDI, autoregressive distributed lag, South Africa

**JEL classification:** F21, F41, F43, O14

## 1 Introduction

The importance of foreign direct investment (FDI) to economic growth is not new. Nevertheless, as much as the relationship has been considered in the literature, the results are still inconclusive. FDI is recognized as a significant driver of economic growth and development in developed, emerging, and developing economies. Herzer et al. (2008) argues that FDI plays an important function in host countries' economic growth by increasing investible capital and technological spillovers. Dupasquier and Osakwe (2005) affirm that FDI complements domestic savings by bestowing foreign savings.

It is believed that the most important fact about the relationship between manufacturing sector FDI and economic growth is that manufacturing sector FDI drives economic growth. South Africa's manufacturing sector FDI has not been contributing to GDP as it ought to, unlike in the other industrial economies.

Several studies in the literature establish a positive relationship between FDI and economic growth (Hlongwana 2015; Moolman et al. 2006; Wang 2009), but others have found a negative relationship (Khobai et al. 2017; Mazenda 2012). The different methodologies used, different study periods explored, and country specifics are the main reasons for difference in the results of these studies.

Many studies have been done to investigate the relationship between FDI and economic growth in South Africa (Fedderke and Romm 2006; Hlongwana 2015; Mazenda 2012; Moolman et al. 2006). However, no study has been done to examine the causal relationship between manufacturing sector FDI and economic growth in the country. This study serves to fill the gap.

The paper is structured as follows: Section 2 focuses on a review of the literature. The theoretical framework is discussed in Section 3. Sections 4 discusses the data and methodology and Section 5 presents the results of the study. Section 6 concludes.

## 2 Literature review

There is empirical evidence from studies examining the relationship between FDI and economic growth. A large number of studies report that FDI has a positive impact on economic growth (see Ayanwale 2007; Melnyk et al. 2014; Moolman et al. 2006; Moudatsou 2003; Strauss 2013; Wang 2009).

Wang (2009) conducted a study of 12 Asian economies to examine the effect of manufacturing sector FDI on economic growth over the period 1987–97 using panel data. The results reveal that FDI in the manufacturing sector has a significant and positive effect on economic growth in the host countries. Moudatsou (2003) investigated the relationship between FDI and economic growth in the European Union over the period 1980–2008 using panel data analysis. The results revealed that FDI has a positive impact on economic growth in the European Union. Ayanwale (2007) found that FDI had a positive impact on economic growth in Nigeria over the period 1970–2002 using the ordinary least squares (OLS) and two-stage least squares (2SLS) methods.

Melnyk et al. (2014) investigated the impact of FDI on economic growth in the post-communism transition economies over the period 1998–2010 using panel data analysis. The study found that FDI influenced economic growth in these economies during the period reviewed. Moolman et al. (2006) investigated the macroeconomic link between FDI and economic growth in South Africa

over the period 1970–2003 using cointegration techniques. The findings suggest that a positive and significant link between FDI and economic growth in South Africa.

Strauss (2013) found that FDI had a positive effect on economic growth in the short term in South Africa over the period 1994–2013 using a vector autoregression model. Prabhakar et al. (2015) investigated FDI, trade, and economic growth for BRICS countries (Brazil, Russia India, China, and, since 2010, South Africa) using panel data covering the period from 1993 to 2012. The results confirm a long-run sustainable equilibrium relationship between FDI, trade, and economic growth.

Some studies report that FDI has a negative impact on economic growth (see Khobai et al. 2017; Mazenda 2012).

Mazenda (2012) investigated the effect of FDI on economic growth in South Africa over the period 1980–2010 using the Johansen cointegration test and VECM (vector error correction model) framework. The results suggest that FDI has a negative impact on economic growth in the long run. However short-run results indicated that FDI has a positive impact on economic growth in South Africa. Khobai et al. 2017) found that FDI had a negative influence on per capita GDP growth in South Africa over the period 1970–2016 using quantile regressions.

## 3 Theoretical framework

The model specification used to investigate the relationship between manufacturing sector FDI, economic growth, trade openness, domestic investment, inflation rate, and exchange rate is based on the simple multivariate framework where the link is represented as follows:

$$GDP_t = \alpha_0 + \alpha_1 LMANFDI_t + \alpha_2 TR_t + \alpha_3 GFCF_t + \alpha_4 EX_t + \alpha_5 INF_t + \varepsilon_t$$

where $GDP$ represents GDP growth; $LManFDI$ is manufacturing sector FDI; $TR$ is trade openness; $GFCF$ is gross fixed capital formation; $EX$ is the exchange rate; $INF$ is the inflation rate; $t$ is the time and $\epsilon t$ is the error term representing the omitted variables that influence economic growth.

## 4 Data and methodology

The study employs quarterly time series data for South Africa and spans from 2006 to 2016. Economic growth is proxied by GDP, trade openness, domestic investment, inflation rate, and exchange rate is sourced from the South African Reserve Bank (SARB 2010/2011). Manufacturing sector FDI data are sourced from the Foreign Direct Investment Intelligence Markets (obtained privately).

According to Paksha (2014) and Sheriff, and Amoako (2014), the autoregressive distributed lag (ARDL) model is preferred over other cointegration techniques such as Engle–Granger and Johansen for several reasons. First, the ARDL approach does not require all the series included in the empirical model to be non-stationary at integration level and stationary after the first difference, and it can be applied regardless of the level of integration of the variables, whether they are I(1) or I(0), or a mixture of both. Hence, there is no need to run a unit root test in order to test for the level of integration of the variables of interest before applying the ARDL cointegration technique.

Second, ARDL works perfectly with a small sample size, unlike the Engle–Granger and Johansen tests, which require a very large sample in order to produce valid results. Naraya (2004) suggests that the sample should be between 30 and 80 observations in order to apply the ARDL test. Table 1 displays definitions of the variables in the study.

Table 1: Description of variables

| Variable | Definition |
|---|---|
| GDP | Gross value added by all resident producers in the economy |
| Manufacturing sector FDI | FDI is measured as capital investment in the manufacturing sector |
| Trade openness | Imports plus exports |
| Investment | Gross fixed capital formation in current prices |
| Exchange rate | South African rand value relative to the American dollar |
| Inflation | Consumer price index reflecting the percentage change in the cost of a basket of goods |

Source: author's construction using SARB definitions (except 'manufacturing sector FDI': own definition).

## 4.1 Descriptive statistics

Table 2 presents the descriptive statistics. The descriptive statistics for the data presented in Table 2 show that manufacturing sector FDI and trade openness are not normally distributed based on the Jarque–Bera test. The null hypothesis that the variables are not normally distributed was rejected, except in the case of GDP, gross fixed capital formation, and inflation.

Due to the variability and skewness in the data of manufacturing sector FDI, the variable is log transformed in the study.

Table 2: Descriptive statistics

| Variables | Mean | Std deviation | Jarque–Bera |
|---|---|---|---|
| GDP | 2.33 | 2.72 | 3.31 |
| Manufacturing sector FDI | 5.62 | 1.08 | 6.45 |
| Gross fixed capital formation | 3.74 | 9.67 | 2.09 |
| Exchange rate | −1.48 | 6.54 | 5.42 |
| Trade openness | 7.83 | 26.67 | 13.13 |
| Inflation | 5.43 | 1.71 | 1.29 |

Source: author's construction based on own computations.

## 4.2 Unit root tests

Unit root tests are conducted before the empirical estimations in order to determine the order of integration of the variables. The unit root tests utilized are the Augmented Dickey–Fuller (ADF; Dickey and Fuller 1981) and the Phillips–Perron (PP; Phillips and Perron 1988) tests. The ADF removes all the structural effects in the time series and then tests using the same procedure as that of the Dickey–Fuller test. PP tests are similar to ADF tests, but they incorporate an automatic correction to the ADF procedure to allow for auto-correlated residuals (Mazenda 2012).

The results of the unit root tests for the study are presented in Table 3. The results show that the variables are stationary at level for the ADF and PP unit root tests. It is important to highlight that

the study estimates a model in the general form of intercepts and intercept and trends to test for the unit root. Given these results, OLS is a good model, as all the series are all I(0) or stationary. However, as the sample of the study is 42 observations, OLS cannot provide sufficient results since it requires a very large sample of at least 84 observations. Therefore, it was decided to run the ARDL model with a small sample and with a mixture of I(0) and I(1), or purely I(1) or purely I(1).

Table 3: Unit root test results at level

| Variables | ADF test | | PP test | |
|---|---|---|---|---|
| | Intercept | Intercept and trend | Intercept | Intercept and trend |
| GDP | −3.75* | −4.0393** | −3.66* | −4.03* |
| Trade openness | −4.953* | −4.922* | −4.862* | −4.89* |
| Manufacturing sector FDI | −6.554* | −5.720* | −6.568* | −5.768* |
| Exchange rate | −5.415* | −5.340* | −5.441* | −5.319* |
| Inflation | −4.3007* | −4.204* | −4.304* | 4.200 |
| Gross fixed capital formation | −3.498* | −3.734* | −3.523* | −3.77* |

Note: * and ** indicate significance at the 1% and 5% levels, respectively.

Source: author's construction based on own computations.

## 5 Empirical results

The ARDL model assumes that there is cointegration between the variables. To test for cointegration, the bounds test approach is employed in examining the long-run relationship among the variables. Table 4 presents the results of the ARDL bound test. The computed F-statistics are above the upper bound values at both the 5 and 10 per cent levels of significance, suggesting that we can reject the null hypothesis that there is no cointegration. These results are consistent with the findings of Andinuur (2013), Duarte et al. (2017), and Nchoe (2016). Having found the existence of a long-run relationship, the long-run and short-run dynamics between the variables are estimated. The model selection criterion used is the Akaike information criterion (AIC).

Table 4: Cointegration results

| F-statistics | Critical values | | | |
|---|---|---|---|---|
| | | 5% | 10% | |
| | I(0) | I(1) | I(0) | I(1) |
| | 2.39 | 3.38 | 2.08 | 3 |
| 4.34 | | | | |

Source: author's construction based on own computations.

The long-run estimates are presented in Table 5. In South Africa the exchange rate has a positive impact on economic growth, and significance at the 1 per cent level suggests that depreciation in the currency has a positive impact on economic growth. A 1 per cent increase in the exchange rate

leads to a 0.12 per cent increase in economic growth, holding other things constant. Manufacturing sector FDI is negatively signed and significant at the 10 per cent level, but insignificant at the 5 per cent level. A 1 per cent increase in manufacturing FDI leads to a 0.72 per cent decrease in economic growth. The results are consistence with Mazenda's study (2012), which suggests that FDI has a negative impact on growth in the long run. The other coefficients are in line with theoretical expectations. Investments have a positive and significant impact on economic growth, holding other things constant. Inflation is negatively related to GDP growth and significant at the 1 per cent level, implying that a 1 per cent increase in inflation leads to a 0.62 per cent decrease in economic growth, holding other things constant. Trade openness has a positively signed and insignificant impact at the 1 per cent level, implying that a 1 per cent increase in trade openness leads to a 0.013 per cent increase in economic growth.

Table 5: Long-run estimates (dependent variable: GDP)

| Variable | T-statistics |
|---|---|
| Exchange | 0.129 |
| | (2.617) |
| Manufacturing FDI | −0.722 |
| | (−1.936*) |
| Gross fixed capital formation | 0.151 |
| | (3.950***) |
| Inflation | −0.624 |
| | (−2.351***) |
| Trade openness | 0.013 |
| | (2.469***) |

Note: * and *** indicate significance at the 1% and 10% levels, respectively.

Source: author's construction based on own computations.

Short-run estimates are shown in Table 6. The coefficients of the error correction term are negative and significant at the 1 per cent level, providing further evidence that a long-run relationship exists between the variables. In the short run, manufacturing sector FDI has a negatively signed and insignificant impact on economic growth in the first quarter but a positively signed and significant impact on economic growth in the second quarter. Mazenda (2012) found that FDI exerts a positive impact on economic growth in the short run. The remaining variables are in line with *a priori* expectations, with the exception of the exchange rate coefficient. A depreciation of the exchange rate has a positive impact on economic growth in South Africa.

Table 6: Short-run estimates (dependent variable: GDP)

| Variable | T-statistics |
|---|---|
| Exchange | 0.129 |
| | (4.472***) |
| Manufacturing sector FDI | −0.058 |
| | (−0.321) |
| Manufacturing sector FDI (−1) | 0.562 |
| | (3.205) |
| Gross fixed capital formation | 0.128 |
| | (4.751) |
| Inflation | −0.106 |
| | (−0.651) |
| Trade openness | 0.027 |
| | (3.701***) |
| ECM (−1) | |
| | -7.516 |

Note: *** indicates significance at the 10% level.

Source: author's construction based on own computations.

Tests for residual normality, serial correlation, and heteroscedasticity and model misspecification are conducted on the estimated model. The serial correlation test selected is the Breusch–Godfrey Lagrange multiplier (LM) proposed independently by Breusch (1978) and Godfrey (1978). Heteroscedasticity is tested using the Breusch and Pagan (1979) test, while the Ramsey (1969) test is applied to ensure that the model is correctly specified. Normality is tested using the Jarque–Bera test (Gujarati and Porter 2009). The results of the Jarque–Bera, serial correlation LM, and Breusch–Pagan–Godfrey tests indicate a non-rejection of the null hypothesis in all the variables in South Africa. Thus, the residuals of the model are normally distributed, and the estimates of the model are unbiased and efficient. The results of the diagnostic tests are presented in Table 7.

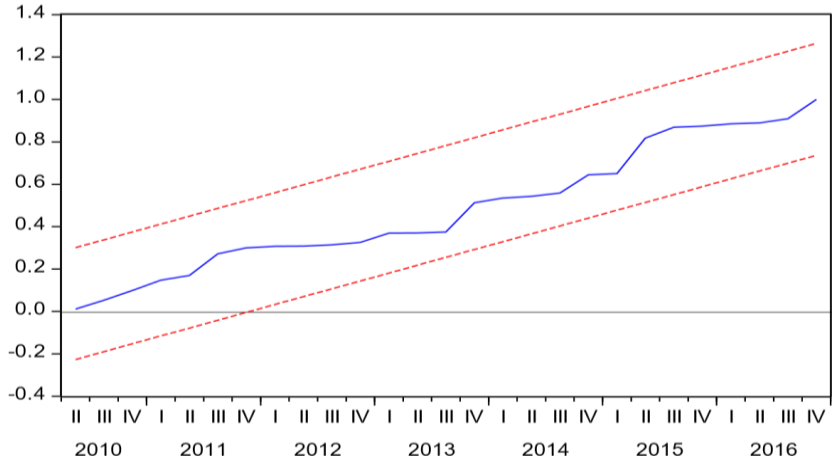
Table 7: Diagnostic tests results (dependent variable: GDP)

| Jarque-Bera test | | Serial correlation LM test | | Breusch–Pagan test | | Ramsey's RESET test | |
|---|---|---|---|---|---|---|---|
| J. Bera | P-value | F-stat. | P-value | F-stat. | P-value | F-stat. | P-value |
| 0.363564 | 0.833783 | 1.843329 | 0.1792 | 0.398308 | 0.9519 | 0.009319 | 0.9238 |

Source: author's construction based on own computations.

To test for the stability of the coefficients, the cumulative sum of recursive residuals (CUSUM) test is conducted on the estimated model. The CUSUM graph presented in Figure 1 indicates model stability, as the plots are within the 5 per cent confidence interval critical bands.

Figure 1: Cumulative sum of recursive residuals test




Source: author's construction based on own computations.

## 6 Conclusion

The purpose of the study was to examine the effect of manufacturing sector FDI on economic growth in South Africa. FDI is believed to stimulate economic growth by virtue of increasing investible capital and technological spillovers in a host country. The empirical analysis was conducted using the ARDL bound test for the period 2006–16. It included trade openness, domestic investment, inflation, and exchange rate as the additional variables to form a multivariable framework.

The following results were established. A long-run relationship between manufacturing sector FDI and economic growth was validated for South Africa. Further, manufacturing sector FDI has a negative impact on economic growth that is significant at the 10 per cent level but insignificant at the 5 per cent level. In the short run, manufacturing sector FDI was found to have a negative and insignificant impact on economic growth in the first quarter, but a positive and significant impact on economic growth in the second quarter.

The long-run negative relationship between manufacturing sector FDI and economic growth found in this study implies that South Africa should ensure that policies are initiated and implemented with speed if the country is to participate in the gains that can be made through FDI in the manufacturing sector in order to improve the economic performance of the country. As such, policy-makers should ensure that there is adequate quality of labour, as manufacturing sector FDI requires a high level of labour, and infrastructure development to ensure that the South African economic growth is stimulated by manufacturing sector FDI.

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**Appendix A: Lag-length selection criteria**

VAR lag order selection criteria

Endogenous variables: GDP, FDI_MAN, FOREIGN_EXCHANGE_RATE, CAPITAL_FORMATION, INFLATION, TRADE_OPENNESS

Exogenous variables: C

Date: 09/29/17

Time: 13:27

Sample: 2006Q1 2016Q4

Included observations: 40

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | −654.8082 | NA | 9004277 | 33.04041 | 33.29374* | 33.13201* |
| 1 | −610.0272 | 73.88861 | 5932398* | 32.60136 | 34.37468 | 33.24254 |
| 2 | −572.0569 | 51.26000* | 6090926 | 32.50284 | 35.79616 | 33.69360 |
| 3 | −532.6540 | 41.37301 | 7301038 | 32.33270 | 37.14601 | 34.07304 |
| 4 | −485.8667 | 35.09047 | 9474315 | 31.79334* | 38.12663 | 34.08326 |

Note: * indicates lag order selected by the criterion. LR: sequential modified likelihood ratio test statistic (each test at 5% level); FPE: final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan–Quinn information criterion.

Source: author's construction based on own computations.

**Appendix B: ARDL bound test**

Date: 29/08/17 Time: 14:07

Sample: 5 44

Included observations: 40

Null hypothesis: no long-run relationships exist

| Test statistic | Value | k |
|---|---|---|
| F-statistic | 4.345567 | 5 |

Critical value bounds

| Significance | I0 bound | I1 bound |
|---|---|---|
| 10% | 2.08 | 3 |
| 5% | 2.39 | 3.38 |
| 2.5% | 2.7 | 3.73 |
| 1% | 3.06 | 4.15 |

Test equation:
Dependent variable: D(GDP)
Method: least squares
Date: 29/08/17 Time: 14:07
Sample: 5 44
Included observations: 40

| Variable | Coefficient | Std. error | T-statistic | Prob. |
|---|---|---|---|---|
| D(X_MANUFACTURING) | −0.205403 | 0.343523 | −0.597931 | 0.5549 |
| D(X_MANUFACTURING(−1)) | 0.786291 | 0.334626 | 2.349765 | 0.0263 |
| D(INFLATION) | −0.256560 | 0.370421 | −0.692617 | 0.4945 |
| D(INFLATION(−1)) | 0.557629 | 0.374129 | 1.490471 | 0.1477 |
| D(INFLATION(−2)) | 0.452358 | 0.357277 | 1.266125 | 0.2163 |
| D(INFLATION(−3)) | −0.038349 | 0.285998 | −0.134087 | 0.8943 |
| C | 13.99390 | 4.314621 | 3.243366 | 0.0031 |
| X_MANUFACTURING(−1) | −1.161670 | 0.577623 | −2.011121 | 0.0544 |
| TRADE_OPENNESS(−1) | 0.022203 | 0.019095 | 1.162806 | 0.2551 |
| FOREIGN_EXCHANGE_RATE(−1) | 0.095862 | 0.068410 | 1.401286 | 0.1725 |
| CAPITAL_FORMATION(−1) | 0.010302 | 0.058213 | 0.176968 | 0.8609 |
| INFLATION(−1) | −0.965528 | 0.378075 | −2.553797 | 0.0166 |
| GDP(−1) | −1.039489 | 0.242934 | −4.278904 | 0.0002 |

| | | | |
|---|---|---|---|
| R-squared | 0.567734 | Mean dependent var. | −0.147500 |
| Adjusted R-squared | 0.375615 | Std dev. dependent var. | 2.690247 |
| Std. error of regression | 2.125780 | Akaike info. criterion | 4.603112 |
| Sum squared resid. | 122.0114 | Schwarz criterion | 5.151998 |
| Log likelihood | -79.06224 | Hannan–Quinn criterion | 4.801572 |
| F-statistic | 2.955124 | Durbin–Watson stat. | 1.938780 |
| Prob (F-statistic) | 0.009436 | | |

Source: author's construction based on own computations.

## Appendix C: Data used in regression analysis

| Year | GDP | Foreign exchange rate | Capital formation | Manufacturing sector FDI | Trade openness | Inflation |
|---|---|---|---|---|---|---|
| 2006Q1 | 7.2 | 6.1 | 9.5 | 378.3 | 32.2 | 0.4 |
| 2006Q2 | 5.8 | −4.3 | 12.2 | 179.8 | 51.1 | 3 |
| 2006Q3 | 5.6 | −10 | 14.4 | 158.3 | 7.5 | 4 |
| 2006Q4 | 5.6 | −2.2 | 13 | 398.5 | 77.5 | 7.8 |
| 2007Q1 | 6.7 | 1 | 25.5 | 22.0 | 8.3 | 3.1 |
| 2007Q2 | 3.3 | 1.8 | 8.2 | 27.9 | −3.7 | 4.7 |
| 2007Q3 | 4.8 | −0.1 | 4.7 | 643.5 | −4.1 | 5 |
| 2007Q4 | 5.8 | 5.1 | 8.4 | 55.5 | 23.2 | 7.7 |
| 2008Q1 | 1.7 | −9.9 | 18.2 | 1089.2 | −5.3 | 7.2 |
| 2008Q2 | 5 | −3.4 | 13.3 | 421.7 | 26.5 | 7.5 |
| 2008Q3 | 1 | 0 | 20.5 | 300.7 | 18.3 | 8.1 |
| 2008Q4 | −2.3 | −21.5 | 10 | 2078.1 | −45.6 | 8.5 |
| 2009Q1 | −6.1 | −0.6 | −25.2 | 335.9 | −81.7 | 9.2 |
| 2009Q2 | −1.4 | 17.8 | −14.2 | 12.3 | −38.1 | 7.6 |
| 2009Q3 | 0.9 | 8.5 | −10.8 | 176.7 | 6.6 | 6.6 |
| 2009Q4 | 2.7 | 4 | −3.2 | 431.0 | 32.6 | 4.8 |
| 2010Q1 | 4.6 | −0.2 | −2.3 | 219.8 | 26.8 | 4.1 |
| 2010Q2 | 2.8 | −0.4 | 0.4 | 450.6 | 30.8 | 3.7 |
| 2010Q3 | 4.5 | 2.9 | −2.4 | 495.3 | 23.6 | 2.6 |
| 2010Q4 | 4.3 | 6.1 | −1.9 | 1078.4 | −3.6 | 5.2 |
| 2011Q1 | 3.9 | −1.3 | 13 | 305.7 | 20.3 | 2.4 |
| 2011Q2 | 2.3 | 3 | 7.2 | 2828.9 | 5 | 4.8 |
| 2011Q3 | 1.2 | −4.5 | 12 | 509.8 | 29.4 | 4.8 |
| 2011Q4 | 3.1 | −12.1 | 3.7 | 199.0 | 31.2 | 5.1 |
| 2012Q1 | 1.6 | 4.4 | −4.6 | 503.2 | −25 | 4.6 |
| 2012Q2 | 3.6 | −4.5 | 7.7 | 241.5 | 12.3 | 4.7 |
| 2012Q3 | 1.2 | −1.8 | −3.1 | 275.4 | 1.1 | 4.5 |
| 2012Q4 | 1.8 | −4.9 | 4 | 148.1 | 6.3 | 6.4 |
| 2013Q1 | 1.8 | −2.8 | 9.8 | 370.6 | 12.5 | 5.5 |
| 2013Q2 | 4.3 | −5.7 | 12 | 202.1 | 20.5 | 4.7 |
| 2013Q3 | 1.8 | −5.1 | 11.5 | 299.4 | 6.6 | 4.8 |
| 2013Q4 | 5.2 | −1.6 | 4.9 | 491.2 | −14 | 6.7 |
| 2014Q1 | −1.6 | −6.5 | −8.5 | 671.2 | 27.8 | 5.5 |
| 2014Q2 | 0.7 | 3.1 | −0.6 | 905.0 | −32.6 | 5.9 |
| 2014Q3 | 2.2 | −2 | 6.4 | 339.0 | 21 | 5.5 |
| 2014Q4 | 4.1 | −4 | 4.6 | 303.3 | 25.3 | 6.7 |
| 2015Q1 | 1.9 | −4.5 | 3.1 | 331.6 | 18.3 | 5.1 |
| 2015Q2 | −1.8 | −3 | −2.1 | 80.4 | 0.2 | 5.4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2015Q3 | 0.4 | −6.8 | 5.4 | 514.2 | 0.8 | 5.5 |
| 2015Q4 | 0.5 | −8.4 | −4.8 | 251.7 | 4.9 | 6.2 |
| 2016Q1 | −1.5 | −10.7 | −10.4 | 123.3 | −15.5 | 6.2 |
| 2016Q2 | 3.1 | 5.6 | −2.8 | 649.9 | 8.9 | 5.4 |
| 2016Q3 | 0.4 | 6.8 | −3.5 | 167.6 | −22.2 | 5.6 |
| 2016Q4 | −0.3 | 1.2 | 1.7 | 49.7 | 18.6 | 6.2 |

Source: author’s construction based on own computations.