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# Japan

The relationship between real GDP  
and Real Primary Exports

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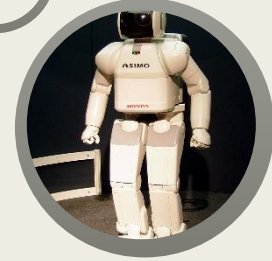


# Context

- Motivation behind the country selection
- Country profile
- GDP and Export relationship
- Methodology
- Results
- Conclusion

# Reason of choice

- 3<sup>rd</sup> largest economy in the world
- Japanese cultural philosophy in their economy
- Small agricultural area – High yield
- Worldwide known mastery of manufacturing
- Infrastructure investments



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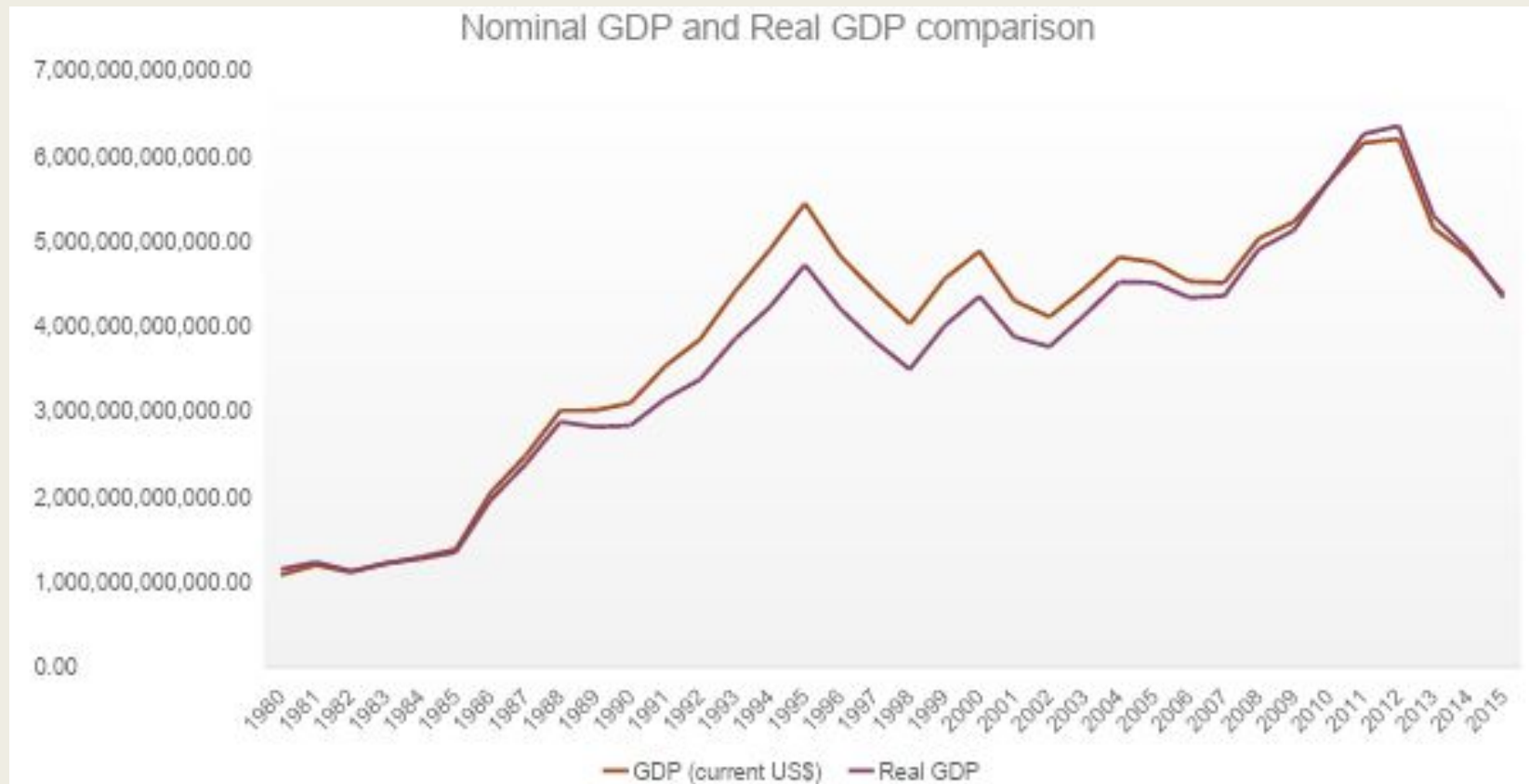
# Country profile

**1980**

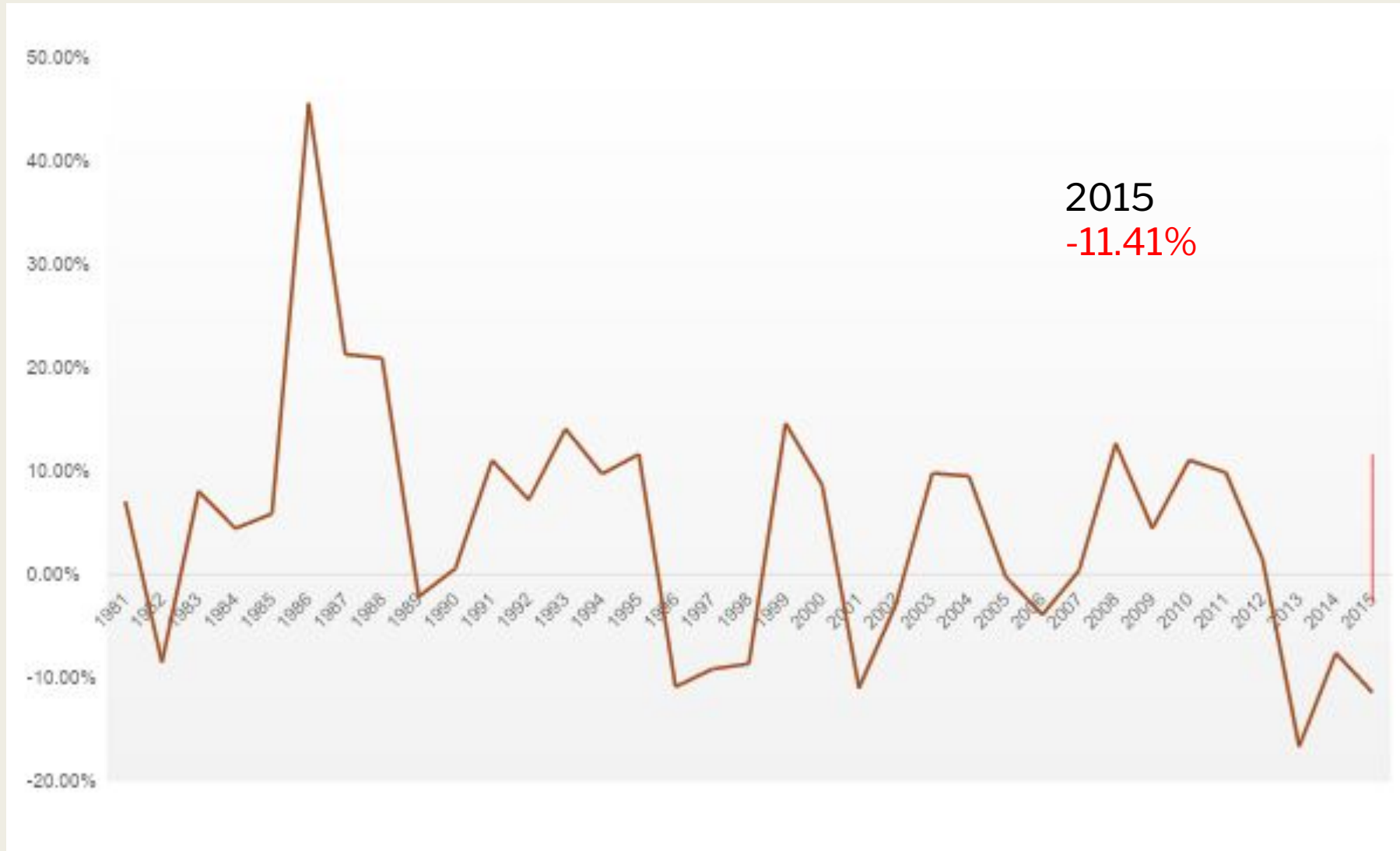
- ❖ Nominal GDP - \$1,086,988 million
- ❖ Real GDP - \$1,152,382 million

**2015**

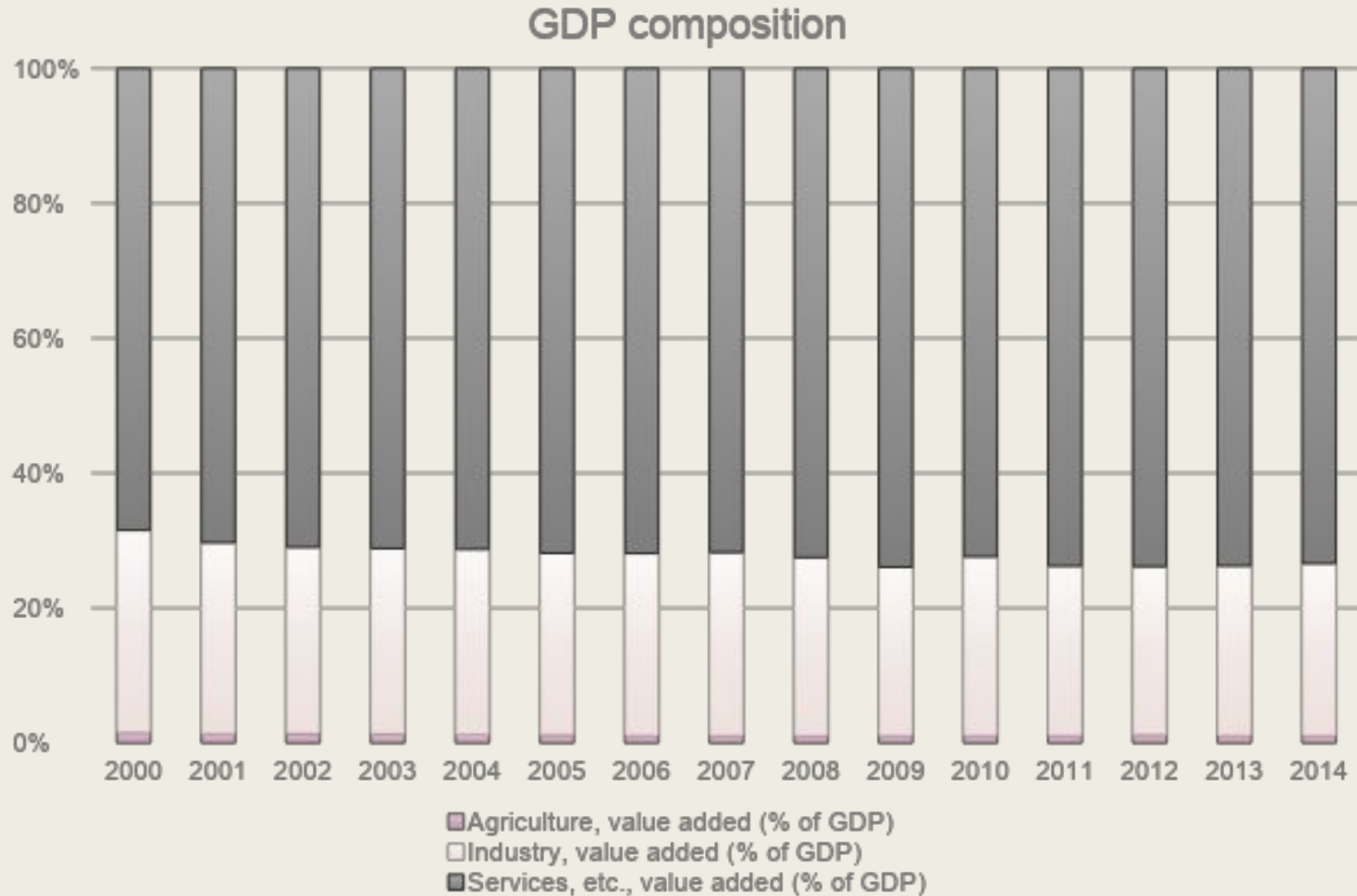
- ❖ Nominal GDP - \$4,383,076 million
- ❖ Real GDP - \$4,341,086 million



# GDP Growth



# GDP composition



**2014**

Agriculture: 1.17%

Industry: 26.86%

Services, etc:  
71.97%

# Real Export



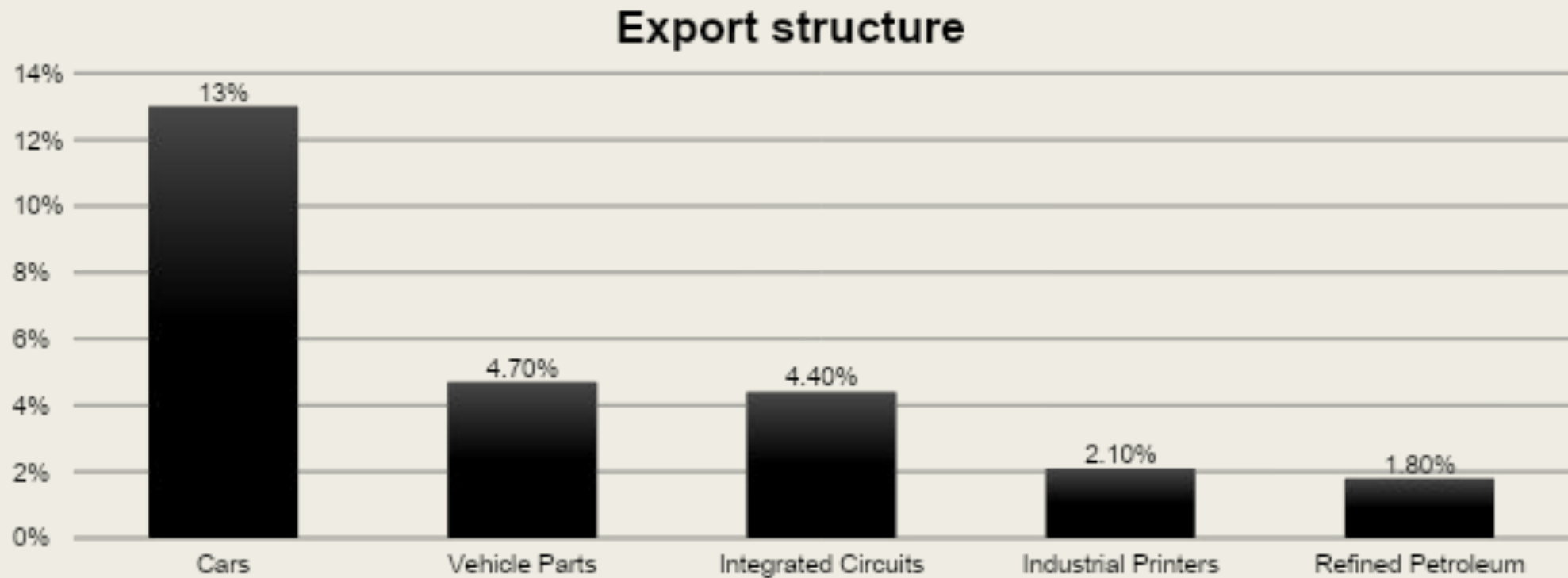
**1980**

\$132.1 billion

**2015**

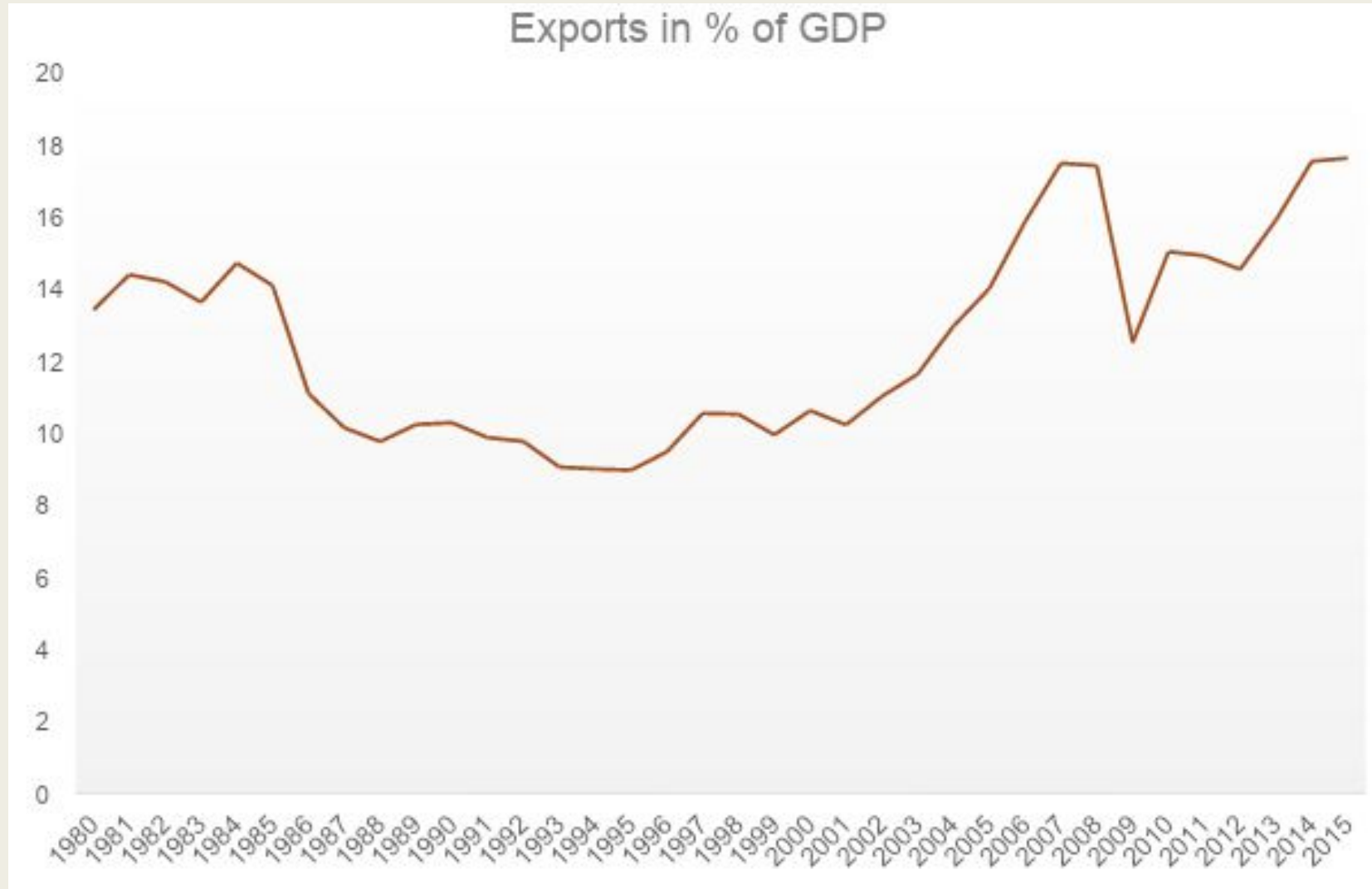
\$580.4 billion

# Export Structure





# Exports (% of GDP)



# **GDP and export relationship**

- No foreign constraints
- Improved technology
- Increased productivity
- Economies of scale
- More production □ more export

# **Methodology**

- ❖ Unit root test
- ❖ Co – integration test
- ❖ Vector Autoregressive model

# Unit root test

■

$$\Delta y_t = \gamma y_{t-1} + \sum_{i=1}^{p^{**}} \beta_i \Delta y_{t-1} + \varepsilon_t$$

■  $H_0: \gamma = 0$  (Non-stationary)

■  $H_A: \gamma < 0$  (Stationary)

|           | At level       |                 |        |  | At 1 <sup>st</sup> difference |                 |        |
|-----------|----------------|-----------------|--------|--|-------------------------------|-----------------|--------|
| Variables | Test statistic | Critical values | Prob.* |  | Test statistic                | Critical values | Prob.* |
| Export    | 1.7930         | -1.61           | 0.083  |  | 0.38624                       | -1.61           | 0.702  |
| GDP       | 1.2621         | -1.61           | 0.217  |  | 2.0567                        | -2.60           | 0.048  |

➤ Non-stationary at level, but stationary at first difference

# Co - integration test

- $$\Delta e_t = \gamma e_{t-1} + \sum_{i=1}^p \beta_i \Delta e_{t-1} + \varepsilon_t$$
- $H_0$ : non-stationary residuals (no co-integration exists)
- $H_A$ : the residuals are stationary (co-integration exists)

| Variables | Test statistic | Critical values | Prob.* |
|-----------|----------------|-----------------|--------|
| residuals | -7.3375        | -3.67           | 0.044  |

-7.3375 < -3.67 , therefore, we can reject the null

- The GDP and Exports are co-integrated

# VAR model

| Short run relationship | Prob.* | Significance level |
|------------------------|--------|--------------------|
| GDP → Export           | 0.534  | 0.05               |
| Export → GDP           | 0.259  | 0.05               |

- $DX(-1)$  and  $DY(-1)$  are not significant
- No short-run effect from exports to GDP
- No short-run effect from GDP to exports

# Conclusion

- *Decline in Real GDP and Real Exports*
- *Unit root test* – series are non-stationary
- *Co-integration test* – real GDP and real Export are co-integrated
- *VAR model* – there is no short term relationship of GDP and Export

# References

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