

# ECO 406

# Developmental Macroeconomics

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## Lecture 5

## Currency Appreciation and Dutch Disease

# The Dutch Disease

- **Dutch disease** is the result of a permanent **overvaluation** of the currency
  - Main reason some countries lag behind in the process of **industrialization** and economic **growth**
- Main **cause** of Dutch disease is **Ricardian rents** originating in the exploitation of abundant and cheap **natural resources**
- Currency **overvaluation** does not allow **efficient** domestic firms in the tradable sector to compete
- If the Dutch disease is **neutralize**, natural resources could be a **blessing** for a country
- **Dutch disease** could be consistent with a country's **current account** equilibrium

# The Classical Dutch Disease Model

- The classical ***Dutch disease*** model consists of three sectors:
    - The booming ***natural resource*** (tradable) sector
    - The lagging ***manufacturing*** (tradable) sector
    - The ***non-tradable*** sector
  - The ***appreciation*** of the currency reflects a change in ***relative prices*** in favour of the ***non-tradable*** sector
    - The ***wealth*** shock in the natural resource sector creates an excess ***demand*** in the ***non-tradable*** sector
- ***Dutch disease*** is a ***market failure*** because it distorts a fundamental macroeconomic price: the ***exchange rate***
    - It generates a negative ***externality*** in the non-commodity ***tradable*** sector

# Process of De-Industrialization

- The commodity and non-commodity *tradable* sectors are *price-takers* in the international market
- The domestic *commodity* sector has lower production *costs* than foreign competitors
  - Therefore, it enjoys *Ricardian rents*
  - It's compatible with a relatively *higher* currency value, i.e., lower exchange rate
- The domestic *non-commodity* tradable sector has similar production *costs* to those of foreign competitors
  - It's compatible with a relatively *lower* currency value, i.e., higher exchange rate

# Process of De-Industrialization (cont'd)

- In the *non-commodity* tradable sector, *efficient* firms using *state-of-the-art* technologies become *uncompetitive* as a result of the *overvaluation* of the currency
- *Resources* are thus reallocated away from the *non-commodity* tradable sector towards the *commodity* and *non-tradable* sectors
- If the government fails to *neutralize* Dutch disease
  - *Ricardian rents* will be distributed among *commodity producers* (higher profits) and all *consumers* (lower import prices)
  - The currency will remain *overvalued*
  - The *non-commodity* tradable sector will become *unviable*

# The Equilibrium Exchange Rate

- In the absence of *Dutch disease* (and *capital* flows), there is a *unique* exchange rate *equilibrium*

- The *current account* equilibrium exchange rate ( $e_{cc}$ )
  - This rate guarantees a reasonable *profit* rate to *efficient* firms in the *tradable* sector

- In the case of *Dutch disease*, there are *two* exchange rate *equilibria*

- The *current account* equilibrium exchange rate ( $e_{cc}$ )
  - This rate guarantees a reasonable *profit* rate to those producers causing the *Dutch disease*

- The *industrial* equilibrium exchange rate ( $e_{ind}$ )
  - This rate guarantees a reasonable *profit* rate to *efficient* firms in the *non-commodity* tradable sector

# Equilibrium with Dutch Disease

- Depending on *demand* and *supply*, the market *price* exchange rate ( $e_m$ ) fluctuates around the *current account* equilibrium exchange rate ( $e_{cc}$ )
    - In the long run, the market *price* exchange rate converges to the *current account* equilibrium exchange rate
    - But the *industrial* equilibrium exchange rate ( $e_{ind}$ ) is the *true* equilibrium rate (the “*competitive*” exchange rate)
  - The *difference* between the *current account* and the *industrial* exchange rates describes the *severity* of Dutch disease
    - The larger the *Ricardian rents*, the greater the *severity*
- The *difference* between the *current account* and the *industrial* equilibrium exchange rates reveals a *market failure*

# Dutch Disease and Market Failure

- Without **Dutch disease**, the **equilibrium** exchange rate corresponds to the equilibrium of **relative prices**
  - It implies the **equalization** of **profit** rates in the long run
  - The **current account** equilibrium exchange rate ( $e_{cc}$ ) and the **industrial** equilibrium exchange rate ( $e_{ind}$ ) are equal
- If there is **Dutch disease**, the **industrial** equilibrium exchange rate ( $e_{ind}$ ) is the **true** equilibrium rate
  - It's higher than the **current account** equilibrium rate ( $e_{cc}$ )
  - Thus it requires exchange rate **management** to neutralize the **Dutch disease**
- If there is **Dutch disease**, **efficient** firms will have a negative expected rate of **profit** and will not **invest**



# The Market Exchange Rate

- The market **price** exchange rate ( $e_m$ ) is the price of foreign currency
  - It's the result of the interaction between the **demand** for foreign currency and the **supply** of foreign currency
- Measured in domestic currency, the exchange rate ( $e_m$ ) is equal to the price in **domestic** currency of the representative good ( $P_{x\#}$ ) divided by its **price** in **foreign** currency ( $P_{x\$}$ )
  - Since  $P_{x\#} = e_m P_{x\$}$ , then  $e_m = P_{x\#}/P_{x\$}$
- In the absence of capital **flows**, the exchange rate is usually in **equilibrium** when the **current account** is balanced
  - Market forces cause the market **price** to fluctuate around the **current account** equilibrium exchange rate ( $e_{cc}$ )

# The Value of the Exchange Rate and Necessary Price

- The market *price* exchange rate ( $e_m$ ) fluctuates around its *value*
- Without *Dutch disease*, the *value* of the exchange rate is the rate that allows *efficient* firms in the *non-commodity* tradable sector to cover *costs* plus a reasonable *profit* rate
  - The *value* of the exchange rate allows the *necessary price* efficient firms need to remain producing
- Therefore, without *Dutch disease*, the *value* of the exchange rate is the *current account* equilibrium exchange rate ( $e_{cc}$ )

# The Value of the Exchange Rate and Necessary Price (cont'd)

- If there is *Dutch disease*, then there are two *equilibria* corresponding to two *values*
- The *current account* equilibrium exchange rate ( $e_{cc}$ ) is the rate that allows firms in the *commodity* tradable sector to cover *costs* plus a reasonable *profit* rate
  - The *value* of the exchange rate is  $e_{cc}$
- The *industrial* equilibrium exchange rate ( $e_{ind}$ ) is the rate that allows *efficient* firms in the *non-commodity* tradable sector to cover *costs* plus a reasonable *profit* rate
  - The value of the exchange rate is  $e_{ind}$

# The Value of the Exchange Rate and Necessary Price (cont'd)

- In the absence of *Dutch disease*, then:

$$e_{cc} = e_{ind}$$

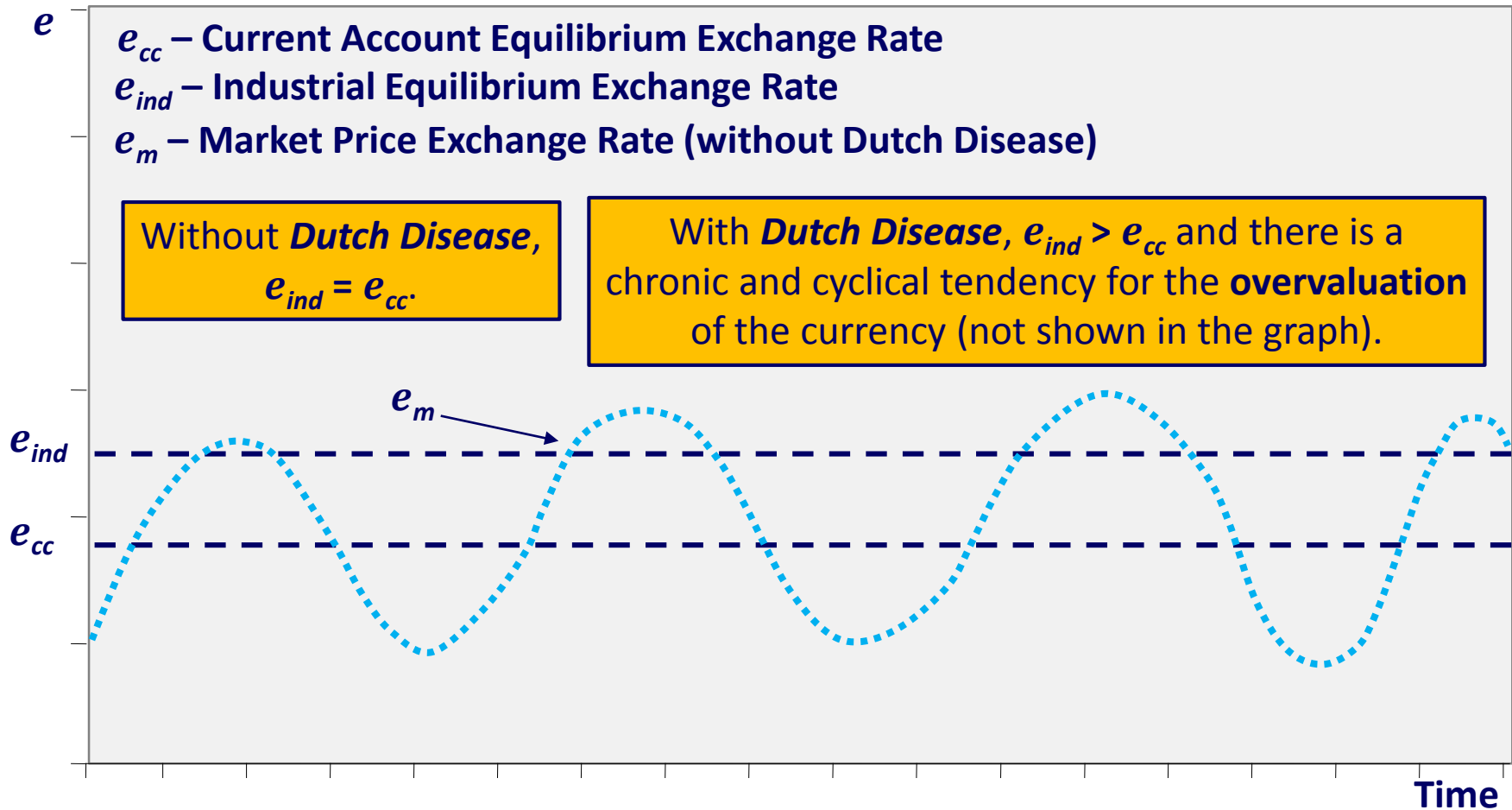
- If there is *Dutch disease*, then:

$$e_{cc} < e_{ind}$$

- In both cases, the market *price* exchange rate ( $e_m$ ) fluctuates around the *current* necessary price ( $e_{cc}$ ) according to the *supply* and *demand* for foreign currency

- If there is *Dutch disease*, *efficient* firms in the *non-commodity* tradable sector will become *unviable*

# Market and Equilibrium Exchange Rates without Capital Flows



# What Determines the Values or Necessary Prices?

- The two *necessary prices* or *values* depend on:
  - The average *productivity* of firms producing either *commodities* (in the case of  $e_{cc}$ ) or other *tradable* goods (in the case of  $e_{ind}$ )
  - The average *wages* these firms pay relative to other countries' *productivity* and *wages*
- Therefore, necessary prices or values depend on the *unit labour cost* (i.e., *wages* divided by *productivity*) relative to the unit labour costs of the main trading partners

# The Severity of the Dutch Disease

- The ***difference*** between the ***current account*** equilibrium exchange rate ( $e_{cc}$ ) and the ***industrial*** equilibrium exchange rate ( $e_{ind}$ ) indicates the ***severity*** of the ***Dutch disease***
  - Note that the ***difference*** between these equilibrium exchange rates must be large enough to characterize ***Dutch disease***
- The ***severity*** of the ***Dutch disease*** ( $g$ ) can be defined as:

$$g = (e_{ind} - e_{cc}) / e_{ind}$$

- The ***severity*** of the ***Dutch disease*** depends on the ***Ricardian rents*** involved
  - The ***Ricardian rents*** are not ***constant*** but vary depending on the international ***price*** of the commodity

# Extended Concept of the Dutch Disease

- There are different *sources* of Dutch disease:
  - Exploitation of abundant and cheap *natural resources*
  - High levels of *remittances*
  - High levels of *foreign aid*
- Another important *source*:
  - Abundance of *cheap labour* and a large difference between average *salaries* of *skilled* and *unskilled* workers
  - Note that the *skill-wage* differential must be greater than in rich countries
  - Low *value-added* per capita industries play a role here similar to that of the *commodity* industry



# Cheap Unskilled Labour and Dutch Disease

- It assumes a country with **two** manufacturing **sectors**:
  - A **low value-added** sector employing **unskilled** labour and paying **low** wages
  - A **higher value-added** sector employing **skilled** labour and paying **higher** wages
- The **equilibrium** exchange rate is determined by the **low-value added** sector hiring **unskilled** labour and paying **low** wages
- The **higher value-added** sector hiring **skilled** labour and paying **higher** wages will not be competitive with  $e_{cc}$ 
  - It requires a **higher exchange rate** to be competitive

# Cheap Unskilled Labour and Dutch Disease (cont'd)

- If ***skill-wage*** differential same as in rich countries, this country would produce the ***low*** and the ***higher*** value-added goods
- But if ***skill-wage*** differential much greater than in rich countries, ***Dutch disease*** would arise
  - Not due to ***Ricardian rents*** but to the ***skill-wage*** differential
- This explains why middle-income countries need to ***manage*** their exchange rates so firmly
  - The exchange rate should be maintained at the level of the ***industrial*** equilibrium rate ( $e_{ind}$ )
  - Thus these countries should have a ***surplus*** in the current account

# The Dutch Disease and Deindustrialization (cont'd)

- **Technological progress** causes what it's called "**non-premature**" process of **deindustrialization**
  - **Labour** is transferred to the **service** sector
  - Simple **manufacturing** jobs are transferred to **developing** countries
- With **Dutch disease**, a "**premature**" process of **deindustrialization** takes place
  - This is due to the **exchange rate** not being kept at the **industrial** equilibrium level ( $e_{ind}$ )
- Therefore, **Dutch disease** needs to be **neutralized**

# The Dutch Disease and Deindustrialization (cont'd)

- If ***Dutch disease*** is not neutralized, ***productivity*** must grow faster than in competing countries for sector to survive
    - But ***overvalued*** currency will gradually damage firms in ***tradable*** sector
  - Higher value-added sector might increase share of imported components to reduce costs
    - It might eventually become a mere ***importer*** and ***assembler*** of the good (***maquila***)
    - While the ***value*** of output might increase, the ***value added*** will fall
- Therefore, the manufacturing sector might become a large ***maquila*** if Dutch disease is not ***neutralized***

# Why Not to Specialize in the Production of Commodities?

- **Neoclassical** economists see nothing wrong for a country to specialize exclusively in the exploitation of **natural resources**
  - It will benefit from its **comparative advantage**
- Economic **development** is characterized by **industrialization**
  - Therefore, **Dutch disease** is an obstacle to **development**
- **Industrialization** takes place whenever labour is transferred to sectors with higher **value-added** per capita
  - **Productivity** increases when labour is transferred to more **sophisticated** sectors (i.e., higher **value-added** sectors)
  - And **productivity** increases is synonymous with economic **development**

# Dutch Disease and the Natural Resource Curse

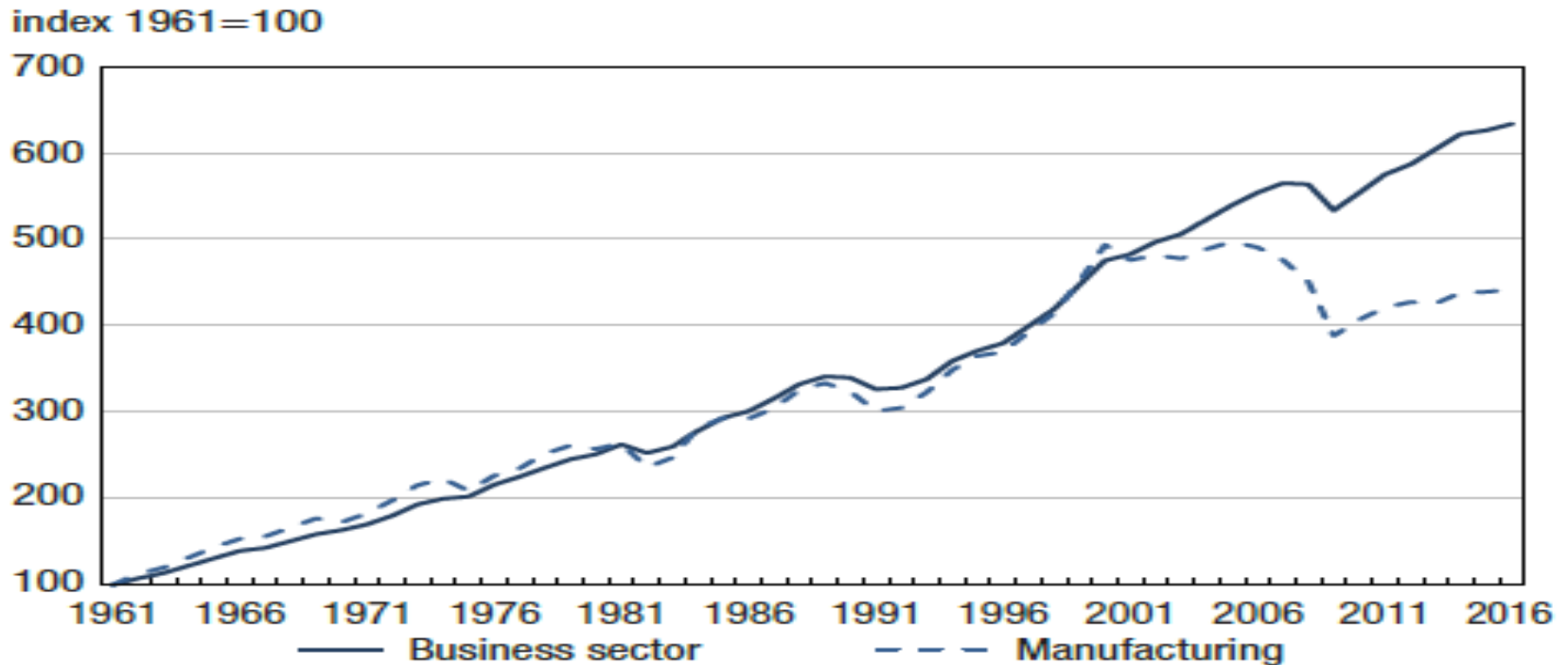
- ***Dutch disease*** involves a contradiction:
  - ***Natural resources*** represent a huge benefit to a country
  - But ***natural resources*** may give rise to ***Dutch disease*** and prevent ***industrialization***
- The ***natural resource curse*** is believed to result from ***weak institutions*** that facilitate ***corruption*** and ***rent-seeking*** behaviour
- However, the main obstacle to ***development*** is not ***corruption*** but the ***overvaluation*** of the currency
  - So ***Dutch disease*** and ***natural resource curse*** should be seen as synonyms

# Dutch Disease in Canada?

- Between 2003-08, oil prices increased from about \$28/b to \$91/b and oil exports rose from about \$16B to \$60B
  - Canadian dollar **appreciated** by about 60% (from US\$0.63 to over US\$1.00)
  - According to Beine et al. (2012), the increase in oil-prices explains about 42% of this appreciation
- Canada experienced a process of **de-industrialization** over that period
  - **Employment** in the **manufacturing** sector was reduced by more than 500,000 jobs
- The Canadian experience suggests that the **natural resource curse** might not necessarily be the result of **weak institutions** that facilitate **corruption** and **rent-seeking** behaviour

# Dutch Disease in Canada? (cont'd)

## REAL GDP, BUSINESS SECTOR AND MANUFACTURING

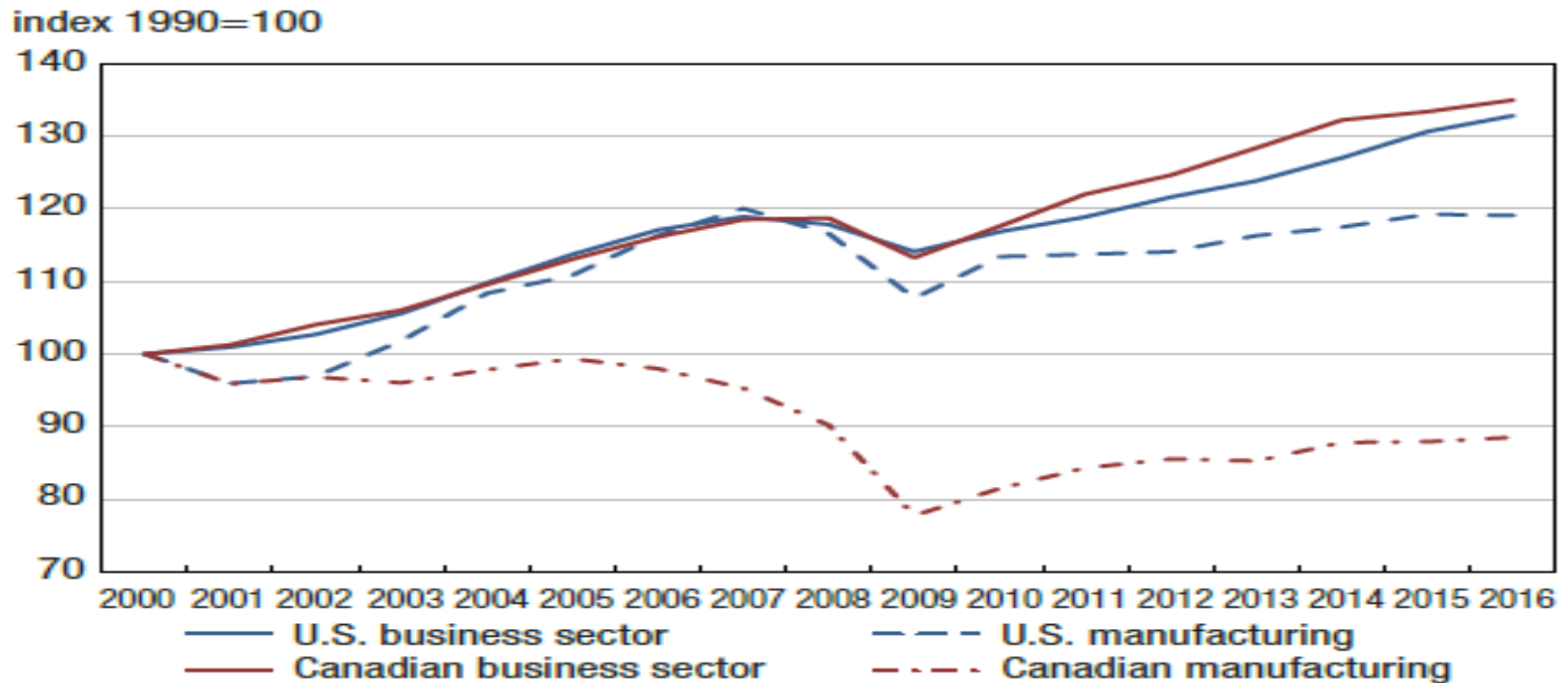


**Source:** Clarke, S. and L. Couture, "Real Growth of Canadian Manufacturing Since 2000," Economic Insights No. 074, Statistics Canada, June 2017.



# Dutch Disease in Canada? (cont'd)

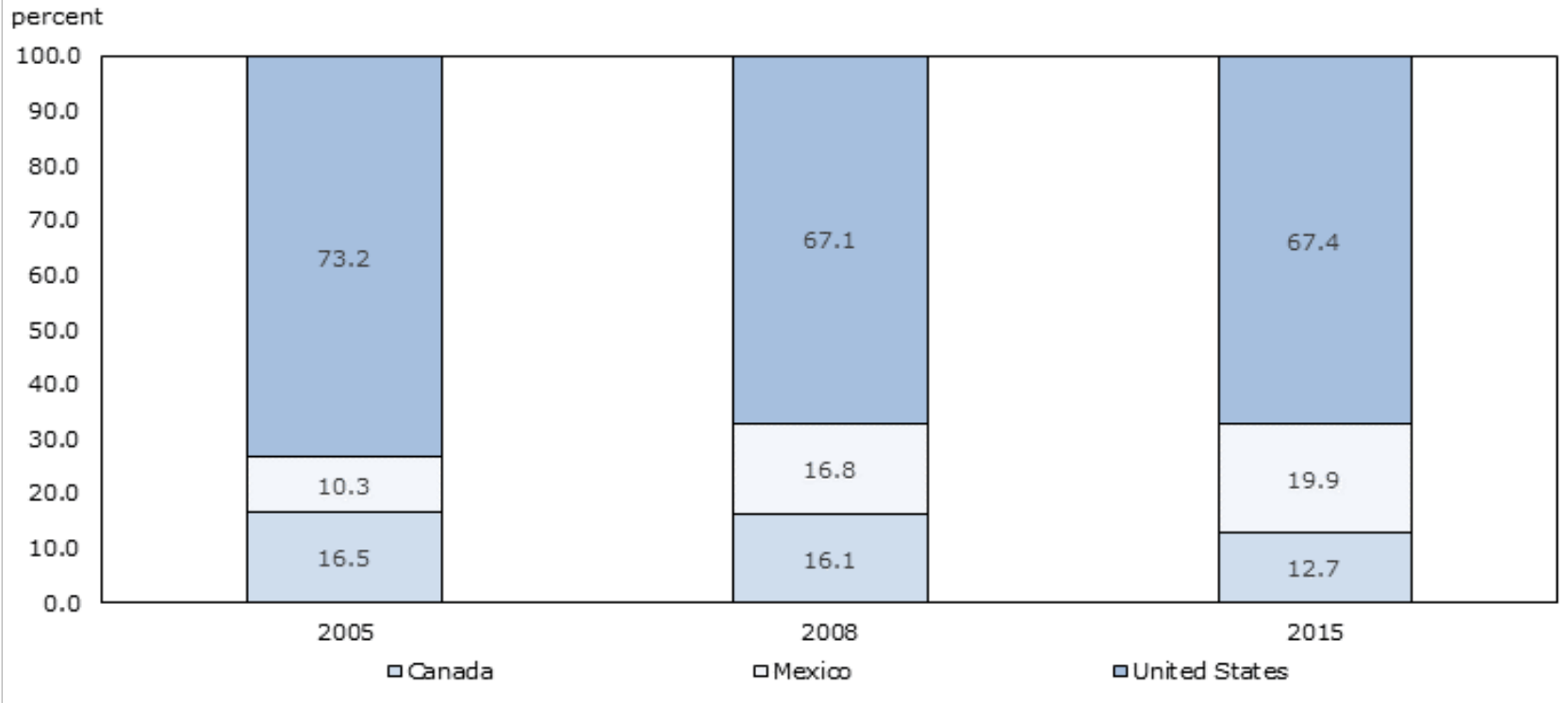
## CANADIAN AND U.S. REAL VALUE ADDED



**Source:** Clarke, S. and L. Couture, "Real Growth of Canadian Manufacturing Since 2000," Economic Insights No. 074, Statistics Canada, June 2017.

# Dutch Disease in Canada? (cont'd)

## SHARE OF NORTH AMERICAN PRODUCTION OF TRANSPORTATION VEHICLES



**Source:** E. Richards, "Differences in Post-recession Performance for Auto Manufacturers and Service Industries," Economics Insights No. 067, Statistics Canada, March 2017.