

# How Do Imports Affect GDP? An Introduction to Gross Domestic Product

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## 1 Introduction

What is GDP? GDP stands for *Gross Domestic Product*. Essentially it is the total value of all goods and services produced within national borders in a given period of time (usually a quarter or year). This definition has two important implications:

1. GDP contains only new final products. In other words, a new car will show up in GDP, but a used car will not. This is done to prevent double counting (the used car would have appeared in a previous year's calculation of GDP) and because GDP seeks to look at the value of goods and services produced *in a given period of time*.
2. Goods that are produced outside a country (aka imports) are not included in GDP since GDP seeks to look only at *domestic* goods and services.

GDP is sometimes colloquially called “economic well-being,” or a measure of economic activity but this is a mis-characterization of GDP. Many important economic activities (eg

consumption of used goods, imports, etc) are not included in GDP.<sup>1</sup> At best, GDP can be seen as a proxy of economic health or well-being, but it should not be treated as a measurement of such.

## 2 How is GDP Calculated?

The formula for GDP is rather simple:

$$GDP = C + I + G + NX \tag{1}$$

Where:

- C = Consumption of Final Goods/Services
- I = Investment (Business' consumption) of Final Goods/Services
- G = Government Spending (excluding transfer payments) on Final Goods/Services
- NX = Net Exports (Exports (E) minus Imports (I))

The final item, Net Exports, tends to cause the most confusion for non-economists. The misconceptions is addressed in the next section.

## 3 International Trade in GDP

### 3.1 Net Exports

As discussed in the Introduction, GDP looks only at domestic production. From that point of view, it makes sense that Imports are subtracted: if we want to look only at domestic

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<sup>1</sup>This is not including other reasons, such as value being subjective. We cannot simply add up consumer spending, in an economic sense.

production, we need to remove international production. To that end, why are Imports included in the formula at all? Why not just say  $GDP = C + I + G + X$ ? The simple reason is: we don't have the necessary data. Currently, it is impossible to determine at point of data collection what dollars are spent on domestic goods and what dollars are spent on imported goods. Consumption (C), Investment (I), and Government Expenditures (G) are all aggregate measures. While we may not know at point of data-collection what the complexion of goods are, we do have data on total imports. Given this data available, we can correct for our aggregation by simply subtracting out imports, thus giving us the Net Exports part of Equation 1. We can rewrite Equation 1 as:

$$GDP = (C_d + C_f) + (I_d + I_f) + (G_d + G_f) + (E - [C_f + I_f + G_f]) \quad (2)$$

Where our variables remain defined the same as above, but the subscript refers to either domestically-produced (d) or foreign-produced (f). Thus, the Net Exports term in Equation 1 is an adjustment factor.

### 3.2 How Does International Trade Figure Into GDP?

International trade causes much confusion regarding GDP given the adjustment factor of Net Exports. For example, a trade deficit (that is, when imports exceed exports), it is shown as a negative in Equation 1. Many non-economists conclude, then, that trade deficits, and imports in general, necessarily *reduce* GDP and thus are harmful to our economic well-being. In the Introduction, I addressed some reasons why this interpretation is problematic, but let's take a look at the GDP formula to see exactly what effect imports have on GDP. Through simple algebraic manipulation and reduction of Equation 2, we get:

$$GDP = C_d + I_d + G_d + E \quad (3)$$

We can see though this algebraic manipulation that imports simply drop out of the equation. Mathematically, this means *imports have no primary effect on GDP!*

### 3.3 A Numerical Example

Let's take a look at a numerical example. Recall Equation 2:

$$\text{GDP} = (C_d + C_f) + (I_d + I_f) + (G_d + G_f) + (E - [C_f + I_f + G_f])$$

For the sake of simplicity, assume there is no Investment, no Government Spending, and no Exports.<sup>2</sup> Further assume no imports and domestic consumption of 100. Thus we have:

$$\text{GDP} = (100 + 0) + 0 + 0 + (0 - 0) \tag{4}$$

Simplifying Equation 4, we get:

$$\text{GDP} = 100. \tag{5}$$

Now, let's say that our hypothetical country opens trade and imports 100 worth of stuff. However, exports do not change, so we have a trade deficit. To explore the effects of the imports on GDP, we assume, in traditional fashion, that all-else-held-equal. Now, we have:

$$\text{GDP} = (100 + 100) + 0 + 0 + (0 - 100) \tag{6}$$

Simplifying Equation 6, we get:

$$\text{GDP} = 200 - 100 = 100 \tag{7}$$

Thus, with this simple example, we see that increasing imports have no primary effect on GDP.

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<sup>2</sup>These assumptions are unrealistic, but they are just simplifying assumptions. We gain complexity, but not different outcomes, by loosening these assumptions. Proof of this is left as an exercise for the reader.

### 3.4 A Final Note

The discussion and example in the preceding sections revolved around the assumption of all-else-held-equal. This assumption was made so we could see the *direct effects* of imports on GDP (of which there is none). Weakening this assumption, it is possible, with some heroic assumptions, that imports indirectly reduce GDP. However, as the analysis shows in this handout, it is incorrect to assert, as many non-economists and politicians do, that imports or trade deficits reduce GDP as a matter of course.