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The Textbook Treatment of Net Exports: Will the Uninformed Reader Understand?

The gross domestic product (GDP) expenditures approach is an effective way to address the components of GDP. However, when it comes to net exports, textbooks often lack detail. Twenty principles-level textbooks were examined for their treatment of net exports within the GDP expenditures approach. Using a scoring rubric, I conclude that only half provide enough detail for an uninformed reader to arrive at a correct understanding of net exports. In this paper, I will correct misconceptions, make three specific recommendations for improving GDP instruction, and provide a short lesson that can be easily implemented in the classroom.

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1. Introduction

Gross domestic product (GDP) is a core component of nearly any economics course. The conceptual framework for introducing GDP is often provided by the expenditures approach, where spending is categorized into buckets: personal consumption expenditures (C), gross private investment (I), government purchases (G), and net exports (Nx). Too often, the textbook treatment of net exports lacks the detail necessary for student understanding – which can result in a flawed view of GDP, economic growth, and trade.

Olson (1997) suggests that textbook authors face a tradeoff between keeping their analysis simple and understandable and representing the material accurately, which often requires more explanation and nuance. This paper will argue that the current treatment of the net exports component within the expenditures approach is incomplete because it lacks the detail necessary for the "innocent reader" to acquire a full understanding of the concept. Using Olson's tradeoff framework, most authors have erred by trending too far to the "simple" end of the tradeoff continuum, leaving readers without enough context for correct understanding. This lack of adequate detail has implications for their understanding of macroeconomics and can perhaps lead to a bias against trade.

2. Literature Review

There is a rich literature analyzing textbook treatment of topics and concepts. Several studies focus on the treatment of specific content, such as sunk costs (Colander, 2004), consumption possibility frontiers (Olson, 1997), international economics (Lee, 1992), and entrepreneurship (Kent, 1989). Coyne and Lucas (2016) argue that the textbook treatment of government provision of public goods too often neglects government failure. Two studies exploring this issue focus on the textbook coverage of government failure: one paper found that textbooks cover market failure more extensively than government failure (Eyzaguirre, Ferrarini, & O'Roark, 2016), and another study argues that textbook coverage of government action as the remedy to market failure has moved from positive (objective) economics closer towards normative (subjective) economics (Eyzaguirre, Ferrarini, & O'Roark, 2014). Another study examined the level of learning in the textbook's objectives and instructor's manuals (Karns, Burton, & Martin, 1983). Holmgren (2017) examined both principles and intermediate-level textbooks for their coverage of consumer choice and then provided a teaching strategy for introducing the concept in a principles course.

Peter-Wim Zuidhof (2014) identified a new genre of textbooks that urge students to "think like an economist." He sees a shift from the Samuelsonian approach that introduces content in the context of scarcity (what to produce, how to produce, and for whom) to a more modern approach that uses a list of core principles. Heyne, Boettke, and Prychitko, who authored a textbook titled *The Economic Way of Thinking*, were early adopters. This approach was also popularized by Mankiw's Ten Principles and used more subtlety in case studies by Frank and Bernanke, which ask students to become "economic naturalists" (Frank, Bernanke, Antonovics, & Heffetz, 2016).

In addition, studies have found that textbook authors and publishers tend to be very similar in their coverage of content. Stiglitz (1988) found most of the existing economics books to be clones of Samuelson's and suggested that market forces had led to a standardization of textbooks. Walstad, Watts, and Bosshardt (1998) did a comprehensive review of textbooks and found a "surprising degree of consensus" with respect to micro and macro topics, but criticized

textbook length and inadequate coverage or emphasis on certain topics such as international economics.

This paper examines the textbook coverage of net exports within the GDP expenditures approach, provides information from the Bureau of Economic Analysis (BEA) about the NIPA accounting process, and then makes recommendations for improving the way the net exports component of the GDP expenditures approach is taught in the classroom. Finally, a short classroom activity is provided to more adequately convey the role of net exports in calculating GDP.

3. Key Concepts

A. Net Exports

Textbooks often provide little room for a discussion of net exports, even though the concept is essential for students' understanding of the impact of trade on economic growth. A 2017 poll found that only 52 percent of Americans think that trade agreements between the United States and other countries are good for the United States (Pew, 2017). However, unlike the general population, economists are overwhelmingly supportive of trade. A 2014 poll found that 83 percent of economists agree that past major trade deals have benefitted most Americans (IMG, 2014). A 2018 poll found 93 percent of economists disagreeing with this statement: "Imposing new U.S. tariffs on steel and aluminum will improve Americans' welfare" (IMG, 2018). Because textbooks set the tone for classroom instruction, they can either propagate or correct misconceptions. Currently, textbooks treat net exports in a context that is likely to reinforce an anti-trade bias in uninformed readers. In this context, an uninformed reader is one with little to no previous economic training or courses. In this sense, uninformed readers are unbiased, intellectually curious, and open to new information. The discrepancy between the public view of trade and the consensus of economists suggests that this is an area where economic education is needed and where a sizable gap can be closed.

The standard treatment of gross domestic product at the introductory and principles levels includes two types of approaches: the expenditures approach and the income approach. In the expenditures approach, GDP is broken into its component parts: personal consumption expenditures (C), gross private investment (I), government purchases (G), and net exports (Nx). The typical instruction includes descriptions of each of the components and discusses its impact on GDP. An equation, such as this one, is often included:

$$GDP = C + I + G + Nx$$

The typical textbook treatment describes the equation as an identity – an equation that is true for all values of the variables because of the way the variables are defined. So, an extra dollar of personal consumption expenditures (C) will also increase GDP by one dollar. This is also true for the rest of the domestic economy – gross private investment (I) and government purchases (G).

International trade is accounted for in the net exports (Nx) portion of the equation. Net exports is defined as simply the value of imports subtracted from the value of exports. This portion typically explains that foreign purchases of domestically produced goods (exports) increase GDP, while domestic purchases of foreign goods (imports) must be subtracted from GDP. While there is nothing in this treatment of net exports that is incorrect, it leaves the uninformed reader with information that will likely result in an incorrect understanding of the content. More specifically, when any value of imports is applied to the identity, because imports

are subtracted from the equation, the result is a decrease in GDP. For example, assume a U.S. consumer purchased a car produced in Japan (an imported good) for $30,000. Using the information provided above, the uninformed reader would conclude that the author's purchase of the car reduced GDP by $30,000. Of course, this is not correct. GDP is defined as the total market value, expressed in dollars, of all final goods and services *produced in an economy* in a given year. As such, the purchase of a domestically produced car should increase GDP, but the purchase of an imported car should have no impact on GDP.

B. GDP Accounting

Although the expenditure method is an accounting mechanism, it is rarely identified as one; this can lead to confusion and potentially bias students against imports. As an accounting mechanism, it demands that we subtract imports to account for the fact that the good has already been counted in personal consumption expenditures (C), gross private investment (I), or government purchases (G). Using our previous example, the price of the car ($30,000) was counted as personal consumption expenditures (C), so subtracting the $30,000 as an import (–M) ensures that *only* the value of domestically produced goods are counted as GDP. In short, correctly calculated, imports don't count negatively in GDP; rather, they have no impact on GDP. In *Measuring the Economy: A Primer on GDP and the National Income and Product Account* (2015), the Bureau of Economic Analysis (BEA) describes it this way:

> Imports, which is deducted in the calculation of GDP, consists of goods and services that are sold, given away, or otherwise transferred by the rest of the world to U.S. residents. The value of imports is already included in the other expenditure components of GDP, because market transactions do not distinguish the source of the goods and services. Therefore, imports must be deducted in order to derive a measure of total domestic output.

The textbook treatment of net exports in the expenditures approach varies. Many textbook authors capture net exports in a single variable (GDP = C + I + G - Nx), while others have broken it into its component parts [GDP = C + I + G + (X – M)] with exports indicated by "X" and imports indicated by "M." This extra step brings more attention to the individual role that each variable plays in the expenditures approach and is likely to help students differentiate between the two variables. Put differently, using the (X – M) approach brings direct attention to the fact that the two variables behave differently in the expenditure formula. Exports (X) are an addition to GDP. Imports (M) are subtracted from GDP; or, more correctly, they act as a corrective accounting measure used to offset an earlier addition. Textbook authors and instructors need to make this distinction clear to students.

C. Intermediate Goods

When introducing this content, textbooks and instructors consistently (and correctly) emphasize that GDP is a measure of all *final* goods and services produced within a country's borders. This is an effective way to reduce the likelihood of double counting domestic production. The emphasis on *final* goods and services is true and relevant for the production of domestic goods and services, which GDP intends to measure. However, the net exports portion of the expenditure formula includes both final and *intermediate goods*. Regarding exports, the BEA (2017) notes,

> Because exports to foreign residents represent the endpoint of domestic production, they

> include goods and services intended for intermediate as well as final use; any further processing that occurs outside of the United States is foreign production and is not included in GDP. For example, automotive parts that are produced in the United States and shipped to a final assembly plant in Canada are included in U.S. exports and counted as final expenditures in GDP (Fox & McCulla, 2017, p. 228).

Likewise, the import (–M) part of the equation includes both final and intermediate goods. As a result, the many parts that come from abroad that are used to assemble final goods and services in the United States are included in NIPA as imports. Subtracting the value of the imported parts used in the production of domestically produced goods is necessary to correctly account for the true value of domestic production. In describing the production of a car that is assembled domestically but includes foreign steel (an intermediate good), the BEA says, "The foreign-produced steel reflects value added that does not reflect U.S. production and that is offset by the recording of imports of steel (a negative entry in deriving GDP)" (Fox & McCulla, 2017, p. 232).

It is important that students know that the international trading of intermediate goods is an important part of our incredibly specialized global economy and that GDP accounts for that production. As such, the role of intermediate goods in the foreign sector (X – M) should be taken into consideration. This value-added instructional nuance allows the student to easily account for the value of imported and exported inputs. For example, assume a consumer purchases a new car for $25,000 that was assembled domestically, but $15,000 (or 60 percent) of the inputs were imported. Without considering a value-added strategy, a student might assume that GDP increased by $25,000 because it was assembled in the United States, but this misses the value of the imported inputs. To use the value-added strategy, the value of the car ($25,000) would first be added to personal consumption expenditures (C), but then to account for the value of the car that was not domestically produced, $15,000 of imports (–M) would be subtracted. As such, the purchase of the car would result in a $10,000 increase in GDP.

The misrepresentation of the role of imports extends to politics. Consider a widely circulated paper prior to the 2016 presidential election by then-candidate Donald Trump's economic advisors, Peter Navarro and Wilbur Ross (2016). Navarro and Ross argued that negative net exports decreases GDP:

> The growth in any nation's gross domestic product (GDP) – and therefore its ability to create jobs and generate additional income and tax revenues – is driven by four factors: consumption growth, the growth in government spending, investment growth, and net exports. When net exports are negative, that is, when a country runs a trade deficit by importing more than it exports, this subtracts from growth (p. 5).

They continue by stating that "although some of our imported goods contain American export content, they still represent a significant subtraction from GDP growth, even after accounting for the positive contribution of services to the trade balance" (p. 18). The text implies the same misunderstanding that comes from failing to identify the role of imports in the expenditures approach as an accounting mechanism.

This context is the motivation for the question this paper attempts to address: Do textbooks provide enough information for an uninformed reader (learner) to acquire an accurate understanding of the net exports component of the GDP expenditures formula?

4. Methodology

I surveyed 20 introductory economics and principles of economics textbooks using VitalSource, an online repository of textbooks. I searched for each using appropriate keywords (e.g., "economics," "survey of economics," and "principles of economics"). I used the most recent edition of each textbook (see Table 1).

I analyzed each textbook's treatment of net exports using a systematic approach. First, I checked the following: whether the expenditures approach to GDP was included, whether the GDP expenditure formula was stated in the text, and whether the net exports term was indicated as "Nx" or "(X – M)." Next, each textbook was rated for the quality of the explanation of net exports using a rating scale of 1-4, as explained below.

1. Fully developed concept: The information is correct and enough detail is provided to equip an uninformed reader to understand net exports correctly. This level often includes an example with numbers or provides specific language that indicates that import spending has already been counted as spending in another category.

2. Adequate explanation: The information is correct and enough detail is provided to equip an uninformed reader to understand net exports correctly. At the same time, it lacks an example or enough detail for casual readers.

3. Inadequate detail to ensure student understanding: The incomplete information is presented in such a way that an uninformed reader will likely arrive at an inaccurate conclusion. Books in this category often suggest that imports must be subtracted from GDP but fail to mention that the spending has already been counted in another category.

4. Incorrect information or example: The resource provides incorrect treatment of net exports, ensuring that an uninformed reader will misunderstand net exports.

Finally, I examined each textbook to discover whether it included an indication of GDP as a value-added measure.

5. Results

Findings show that textbook authors weigh the trade-off between coverage and accuracy differently. Of the 20 textbooks examined, all of the textbooks included the expenditures approach to GDP (see Table 1). Eighteen of the 20 textbooks provided students with an algebraic equation (expressing the expenditure variables as letters) to represent the spending components of GDP, but authors used different approaches to representing the net exports portion of the formula. Two texts did not express an algebraic equation. One of these texts (Gwartney, Stroup, Sobel, & Macpherson, 2018) describes the expenditures approach using words rather than variables; the other is the Mandel textbook, which states a list of six expenditure categories and specifies that GDP is the sum of the amounts, but the text does not include a succinct formula. Of the 18 textbooks that provided an algebraic equation, half (nine) of the textbooks captured net exports in a single variable, such as Nx or Xn. The other half (nine) provided a formula that included a specific variable for each of the components (exports and imports).

When rated for their level of treatment, the textbooks varied on how much information they provided the reader. Six books were rated as Category 1, which means they provided explicit detail and context, and likely also an example, to ensure that an uninformed reader would

Table 1 – Treatment of Net Exports in Economics Textbooks

Author(s)	Title (Ed.)	Rating	GDP Equation	Expression
Arnold, Roger A.	*Economics (12)*	3	Yes	(EX – IM)
Bade & Parkin	*Essential Foundations of Economics (8)*	3	Yes	NX
Case, Fair, Ray &Oster	*Principles of Economics (12)*	1	Yes	(EX – IM)
Colander	*Economics (10)*	3	Yes	(X – M)
Frank, Bernanke, Antonovics & Heffetz	*Principles of Economics (6)*	2	Yes	NX
Grant	*Economic Analysis of Social Issues*	1	Yes	(X – M)
Greenlaw, Shapiro & Taylor	*Principles of Economics (2)*	3	Yes	(X – M)
Gwartney, Stroup, Sobel & Macpherson	*Economics: Private and Public Choice (16)*	3	Expressed as words	"net exports of goods and services"
Hubbard & O'Brien	*Economics (6)*	1	Yes	NX
Karlan, Morduch & Startz	*Economics (5)*	3	Yes	NX
Krugman & Wells	*Economics (4)*	2	Yes	X – IM
Mandel	*Economics: The Basics*	2	No stated equation	
Mankiw	*Principles of Economics (8)*	1	Yes	NX
Mateer & Coppock	*Principles of Macroeconomics (2)*	2	Yes	NX
McConnell, Brue & Flynn	*Economics: Principles, Problems and Policies (21)*	1	Yes	Xn
O'Sullivan, Sheffrin & Perez	*Survey of Economics: Principles, Applications, and Tools (7)*	1	Yes	(X – IM)
Ray & Anderson	*Krugman's Economics for AP (2)*	3	Yes	(X – IM)
Slavin	*Economics (11)*	3	Yes	Xn
Tabarrok &Cowen	*Modern Principles of Economics (3)*	3	Yes	nx
Tucker	*Survey of Economics (9)*	3	Yes	(X – M)

understand that the value of imports is initially counted as consumption, investment, or government spending. Then, to ensure that GDP captures only domestic production, its value must be subtracted as an accounting practice. For example, after providing a full explanation of personal consumption expenditures (C), gross private investment (I), government purchases (G), and exports (X), Hubbard and O'Brien (2017) write,

> We subtract imports from total expenditures because otherwise we would be including spending that does not result in production of new goods and services in the United States. For example, if U.S. consumers buy $1 billion worth of furniture manufactured in China, that spending is included in consumption expenditures. But the value of those imports is subtracted from GDP because the imports do not represent production in the United States (p. 387).

In another example, Mankiw (2018) writes,

> The net in net exports refers to the fact that imports are subtracted from exports. This subtraction is made because other components of GDP include imports of goods and services. For example, suppose that a household buys a $40,000 car from Volvo, the Swedish carmaker. This transaction increases consumption by $40,000 because car purchases are part of consumer spending. It also reduces net exports by $40,000 because the car is an import. In other words, net exports include goods and services produced abroad (with a minus sign) because these goods and services are included in consumption, investment, and government purchases (with a plus sign). Thus, when a domestic household, firm, or government buys a good or service from abroad, the purchase reduces net exports, but because it also raises consumption, investment, or government purchases, it does not affect GDP (p. 481).

Both of these explanations are excellent because they give the student enough detailed information to arrive at a correct understanding, and each provides an example with numbers.

Four textbooks were rated as Category 2, which means that they provided correct information in enough detail that makes it likely an uninformed reader could form a correct understanding of how imports impact GDP. However, those rated with a 2 lacked enough detail or an example for students to form the concept fully. One example of a Category 2 textbook comes from Frank, Bernanke, Antonovics, and Heffetz (2016). They note that because imports are already "included in consumption, investment, and government purchases but do not represent spending on domestic production, they must be subtracted. A shorthand way of adding exports and subtracting imports is to add net exports, which equals exports minus imports" (p. 413). This coverage provides the basis for correct understanding, but the inclusion of an example or further detail clarifying that the subtraction of imports is a corrective accounting measure would have placed it in the top category.

Half (ten) of the textbooks were rated as Category 3, which means the description had inadequate detail to ensure student understanding. In other words, while the information is not incorrect, it is likely that an uninformed reader would form an incorrect understanding of how imports impact GDP. In many cases, textbooks made a point of mentioning that the value of imports must be subtracted from GDP to ensure only domestic production is accounted for; however, they fail to mention that the spending was already captured as consumption, investment, or government spending and that subtracting the imported value is meant to offset that spending. The uninformed reader is left with the idea that subtracting imports from GDP actually reduces GDP. Since GDP is a measure of economic production and growth, this implies that imports subtract from economic growth. For instance, Tabarrok and Cowen explain the concept as the following:

> Net exports is exports minus imports. If a nation sells more final goods and services abroad than it buys from other nations, net exports will be positive. A nation that imports more than it exports has negative net exports. Note that U.S. imports contribute to the GDP of other nations—the locations where that value was produced—and we don't want them to count twice; thus in GDP for the United States, we include U.S. exports but subtract U.S. imports (p. 499-500).

Again, the information is correct, but it might not provide students with enough information to draw correct conclusions about how imports affect GDP.

Theologians sometimes discuss sins of "commission" and sins of "omission." A sin of commission is an *action* that comprises moral failure, whereas a sin of omission is an *absence of action* that comprises moral failure. While the depiction of net exports is not a moral issue per se, this reasoning might provide a useful way for thinking about errors made in the treatment of net exports. In many cases, the failure lies in what is *not* said rather than what *is* said. The risk is that an uninformed reader will learn content in such a way that results in a flawed understanding of GDP, net exports, and trade itself.

As previously stated, of the 18 books that provide the equation for GDP, half (nine) of the textbooks captured net exports in a single variable, such as Nx or Xn. The other half (nine) provided a formula that included a variable for both exports (X) and imports (M). Of the two books that did not provide a formula, one was rated a Category 2 and the other a Category 3. There does not seem to be a relationship between the author providing a formula in the text and the text having a more descriptive and complete treatment of how to properly treat imports within that formula. Using the ranking scores above, the authors that used one variable (such as "Nx") had an average score of 2.1, while authors who used two variables (such as "(X-M") had an average score of 2.2. Although the ranking of the textbooks in the study did not vary much by whether or not they uncoupled the net exports variables, doing so is generally beneficial for student comprehension; additionally, the lack of difference between the rankings could be attributed to alternative factors, such as whether or not those textbooks included examples or explicit detail.

None of the books included language or examples that included the more nuanced perspective of production where a U.S.-produced good included intermediate parts that were imported. In our earlier example, a $25,000 car that used $15,000 in imported parts increases GDP by $10,000. This simple addition gives students a more complete understanding of how GDP accounts for trade and is reflective of the way goods are often produced in our modern global context.

While many professors rely on textbooks to provide the foundation of course knowledge, classroom instruction is meant to build understanding, context, and nuance on that foundation. However, while textbooks can be faulted for not providing enough information (omission), the curriculum sometimes errs by providing incorrect information (commission). Take the example *Capstone: Exemplary Lessons for High School Economics*, published by the National Council on Economic Education (Lopus, Morton, Reinke, Schug, & Wentworth, 2003). In Lesson 33 (*Gross Domestic Product and How to Measure It*), teachers are instructed to have student volunteers stand in front of the classroom and hold the GDP expenditure variables (GDP, C, I, G, X, -M). When different scenarios are proposed, students raise or lower the appropriate expenditure variable to indicate how that change will impact GDP. At three different points, the lesson introduces a scenario that increases imports, and all three times the provided answer key informs teachers that GDP should decrease. A video of a teacher teaching this lesson is available on the econedlink website with this same error (CEE, 2003). Importantly, this lesson is likely used by high school teachers who often lack content knowledge in economics (Walstad, 2001)

and might fail to identify and correct the error.

Another educational video that provides incomplete information is Jason Welker's *Measuring GDP Using the Income Approach and the Expenditure Approach* (2011), which uses the circular flow model to teach students the income and expenditures approach to GDP. In doing so, Welker describes spending on imports as a leakage, which is true, but he also states that this must be subtracted from GDP. This implies that GDP has decreased due to the spending, without acknowledging the corresponding increase in consumption spending. Although technically correct and logical, statements such as "leakage" and "subtracted from GDP" without language specifying the subtraction as a corrective accounting measure can leave students with the idea that imports reduce GDP. Students and teachers are increasingly using video to teach concepts, making video a relevant medium to review for clarity and correctness.

6. Recommendations for Improving the Pedagogy

Making a few small changes to the way instructors teach GDP expenditures is not a difficult adjustment and will provide students with a correct understanding of how imports impact GDP. This can have implications for understanding international trade. In addition, this strategy also allows teachers to easily introduce the nuanced value-added aspect of GDP, which better reflects how goods are produced in an increasingly complex global economy. As such, I recommend three strategies for improving GDP instruction.

A. Uncouple the Net Exports Variables

Net exports (exports minus imports) is often abbreviated in a single term "Nx," which can make it difficult for the introductory student to distinguish between the two variables embodied in the single term. Because these two variables behave very differently in the expenditures approach to GDP, it would be helpful for students to see the variables as independent from one another. As such, it is important for teaching resources and teachers to differentiate the role of imports and exports. Thus, I recommend using a formula that separates Nx into two distinct variables, such as,

$$GDP = C + I + G + (X - M)$$

B. Address "–M" as an Accounting Strategy Rather Than an Expenditure Variable

Students are often misled when they see the expenditure equation because they equate the –M part of the equation with each of the other variables – as a single entry of an expenditure. In this case, it makes logical sense to simply subtract the dollar value of the imported goods or services from the dollar value of GDP. Instead, resources and instruction should address the –M variable as an accounting strategy used to ensure than only domestic production is being counted in GDP. Specifically, when personal consumption expenditures (C), gross private investment (I), government purchases (G), or exports (X) increase, GDP increases by the same dollar amounts. However, subtracting imports is a corrective accounting measure that is meant to adjust for spending that has already been counted in one of the other domestic variables (C, I, or G). Again, Mankiw (2018) does this well:

Net exports includes goods and services produced abroad (with a minus sign) because

> these goods and services are included in consumption, investment, and government purchases (with a plus sign). Thus, when a domestic household, firm, or government buys a good or service from abroad, the purchase reduces net exports, but because it also raises consumption, investment, or government purchases, it does not affect GDP (p. 481).

While this is not a dramatic change, the detail provides cues that trigger a correct processing of the concept.

C. Introduce a Globalized Approach to GDP Expenditures

Teaching GDP using the expenditures approach in the conventional way works very well for goods that are easily categorized as domestically produced or as imports; but, in our global economy, very few goods fall easily into these buckets. Rather, many goods are truly global goods. For example, the American Automobile Labeling Act requires automobile manufacturers to provide information to consumers about where an automobile was assembled, but also the percentage of U.S. and Canadian content (by value of the parts) used to assemble the vehicle. Using these standards, the most "American" 2017 model year car was the Kia Optima, with 83 percent of the content originating in the U.S. and Canada and assembled in the United States. By contrast, the Ford Transit Connect is 10 percent U.S. and Canadian content and assembled in Spain (National Highway Traffic Safety Administration).

In a global economy, students need to be exposed to strategies for accounting for the massive trade in inputs and for adjusting GDP for the value of those inputs, but none of the textbooks examined included this nuanced view. Using the –M variable as described above gives teachers the opportunity to frame the expenditures approach within the global marketplace. This more nuanced view of production gives teachers the opportunity to talk about goods being the product of global production, rather than categorizing them as either purely domestically produced or purely imported.

7. A Learning Activity for the Classroom

The activity below can be used as a simple application of the ideas proposed above.

1. Divide students into small groups (3 to 4 per group) and give each group Activity 1 (Appendix A), a pair of scissors, and Activity 2 (Appendix B). Tell the students to cut the expenditures variables into independent pieces.

2. Ask students to arrange the variables on the chart that express the expenditures approach to GDP: GDP = C + I + G + (X – M). Tell the students that each variable should start on the "0" line, which indicates no change.

3. Have one student in the group read prompt #1.

4. As a group, students should discuss how the economic event described in the prompt impacts the GDP expenditure formula. After consensus is reached, students should arrange the variables in the equation to indicate how the event changes GDP.

5. When students have finished prompt #1, have one group member take a picture with a smart phone and email the image to the instructor's email address with "Prompt #1, Group _" in the subject line.

6. Tell the students to work through each of the prompts. Wait for all groups to finish their deliberation.

7. After all groups have completed their work, debrief the activity using the answer key provided. Open the emailed pictures and project them onto your classroom screen. Use the images to discuss each of the scenarios, taking care to discuss the impact of imports and exports on GDP.

8. The lesson can be adapted for large sections using either of the following methods. First, use large pieces of paper, each containing one of the GDP expenditure equation features (GDP, C, I, G, X, and -M), and one paper labeled with an equal sign. Ask for six volunteers to participate by standing in front of the class with the letters, and then ask them to arrange themselves so the letters spell out the equation: GDP = C + I + G + X – M. Read the lesson prompts (Activity 1), and instruct students to raise or lower the appropriate letter to reflect the changes in the equation and the impact on GDP. Second, project the chart from Activity 2 onto a whiteboard or screen. Print larger versions of the expenditure variables in Activity 1 and use invisible tape to adhere the letters to the board or screen. Then, with student participation, use the directions and prompts (Activity 1) to replicate the activity for the entire class rather than smaller groups.

8. Conclusion

Gross domestic product is a standard component of the economics curriculum because a basic understanding of GDP is critical to understanding the economy. The expenditures approach is a standard way to teach the components of GDP. However, as textbook authors consider the trade-off between keeping things simple and providing enough detail for a nuanced understanding, the standard treatment of the textbook approach often errs on the side of brevity. This is evident in the case of net exports, where the lack of detail can leave the uninformed reader with the impression that imports reduce GDP. This outcome means that imports have a contractionary effect on the economy. As such, students are likely to arrive at a mercantilist conclusion, assuming that imports are damaging to the economy. An examination of textbooks found that, while none of the books provided incorrect information, half did not provide enough information for students to draw a correct conclusion about the contribution of imports to GDP. Other teaching resources provided misleading or incorrect information.

I propose three slight adjustments to the classroom treatment of GDP to ensure that students correctly understand the contribution of imports to GDP. First, state the expenditure formula and separate the net export "X" and import "M" variables rather than combining them as "Nx." Treating each as a specific component of GDP gives students the opportunity to recognize them individually. Second, remind students that the –M component is included as an accounting mechanism to ensure that the value of imported goods already included as personal consumption expenditures (C), gross private investment (I), or government purchases (G) is subtracted out. Finally, the tendency to use binary categories of "domestic" and "foreign" as sources of production is unrealistic in our globalized society. As such, I recommend using the GDP expenditures approach to bring attention to two very important points. First, while *final* goods are counted for domestic production (to avoid double counting), the value of imported and exported *intermediate goods* and services are also counted in GDP calculations. The emphasis on "final" goods and services in the definition of GDP can blur students' understanding of this aspect of imports and exports. Second, many of the goods we consume are global products. Using GDP to subtract the value of imported goods and services in the production of domestic goods gives students a more complete understanding of the nature of production in our in-

creasingly global economy. And, counting the value of exported intermediate goods can help students who think "the U.S. doesn't produce anything anymore" consider a broader spectrum of goods and services than the final products we sometimes envision being loaded onto ships for exports. Finally, the short classroom exercise described here can be used to focus attention on this issue and correct for the lack of detail in many textbooks.

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Appendix A

Activity 1

1. Using Activity 2, cut the variables apart and arrange them in order (GDP = C + I + G + X + -M) on the chart along the gray horizontal line.
2. Assign one group member to read Prompt #1 (below), and then discuss how the economic event that is described will affect the variables in the GDP expenditures formula.
3. Move the variables to reflect your decision. Then take a picture of your answer with a smartphone and email the image to your instructor. Use "Prompt #1, Group __" in the subject line.
4. Repeat steps 2 and 3 for each of the remaining prompts.

Prompt #1: Suzanne buys a new car for $30,000; the car was produced in the United States.

Prompt #2: Juan buys a new car for $30,000; the car was produced in Japan.

Prompt #3: Jasmine buys a new car for $30,000; the car was assembled in the United States, but the manufacturer used $10,000 in imported parts in the production process.

Prompt #4: ACME Inc. produces $30,000 worth of car parts and exports them to Germany.

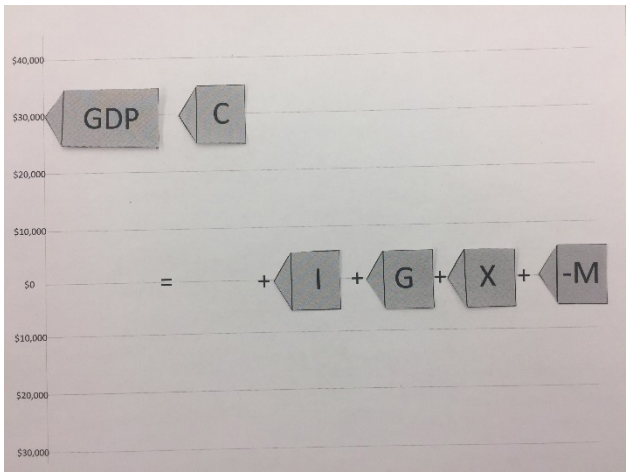
Prompt #5: ACME Inc. buys a new delivery truck for $40,000; it was produced in the United States, but the manufacturer used $20,000 in imported parts in the production process.

Prompt #6: Local government purchases new office furniture for an office building for $25,000; the office furniture was produced in the United States.

Answer Key

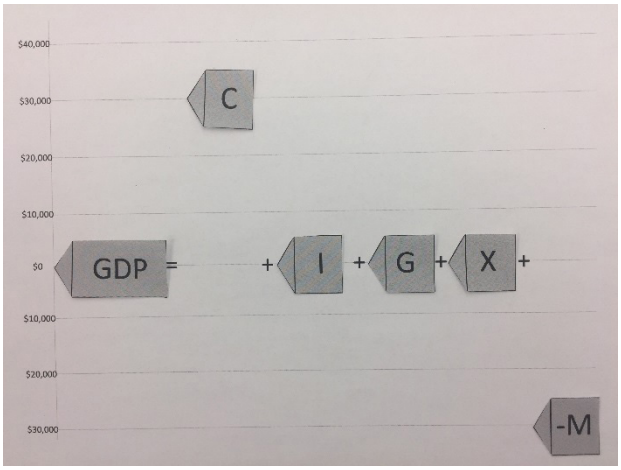
Prompt #1: Suzanne buys a new car for $30,000; the car was produced in the United States.

Answer: Both personal consumption expenditures (C) and GDP increase by $30,000.



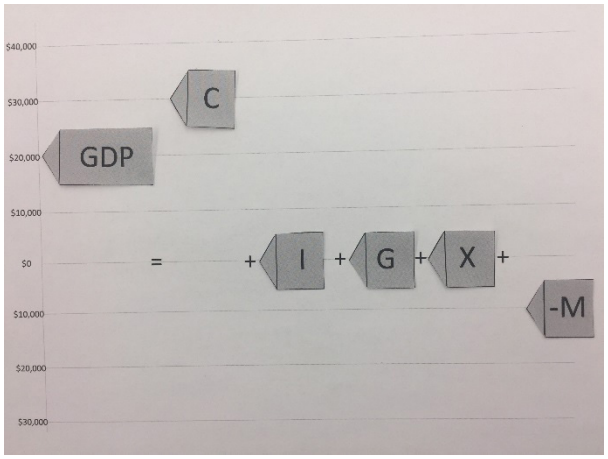
Prompt #2: Juan buys a new car for $30,000; the car was produced in Japan.

Answer: Personal consumption expenditures (C) increases by $30,000, but the value of imports (-M) decreases by $30,000, and GDP is unchanged.



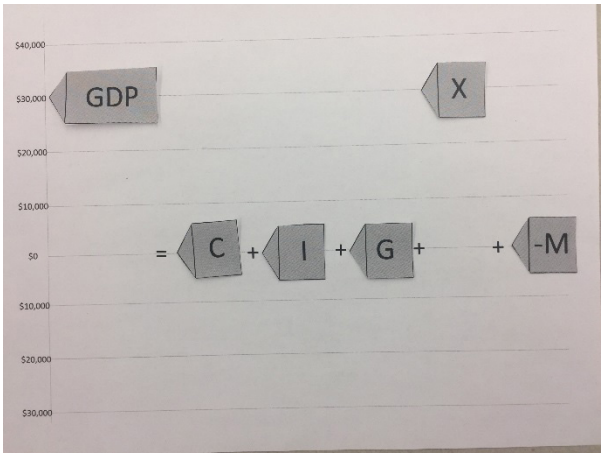
Prompt #3: Jasmine buys a new car for $30,000; the car was assembled in the United States, but the manufacturer used $10,000 in imported parts in the production process.

Answer: Personal consumption expenditures (C) increases by $30,000, imports (-M) decreases by $10,000, and the net effect results in an increase in GDP of $20,000.



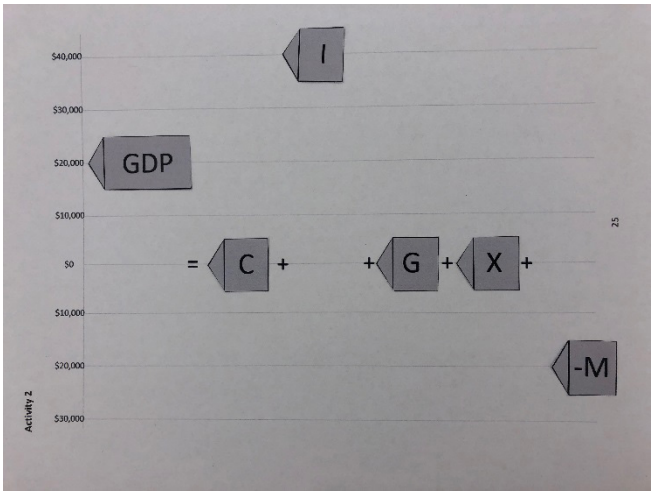
Prompt #4: ACME Inc. produces $30,000 worth of car parts and exports them to Germany.

Answer: Both exports (X) and GDP increase by $30,000.



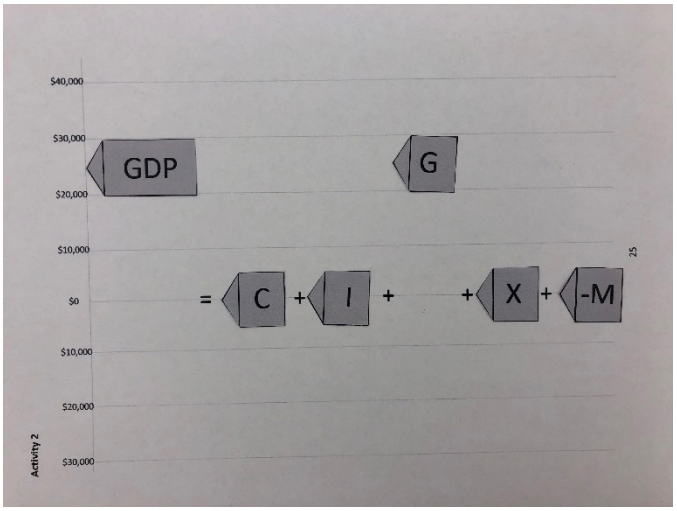
Prompt #5: ACME Inc. buys a new delivery truck for $40,000; it was produced in the United States but the manufacturer used $20,000 in imported parts in the production process.

Answer: Gross Private Investment (I) increases by $40,000, imports (-M) decreases by $20,000, and the net effect results in an increase in GDP of $20,000.



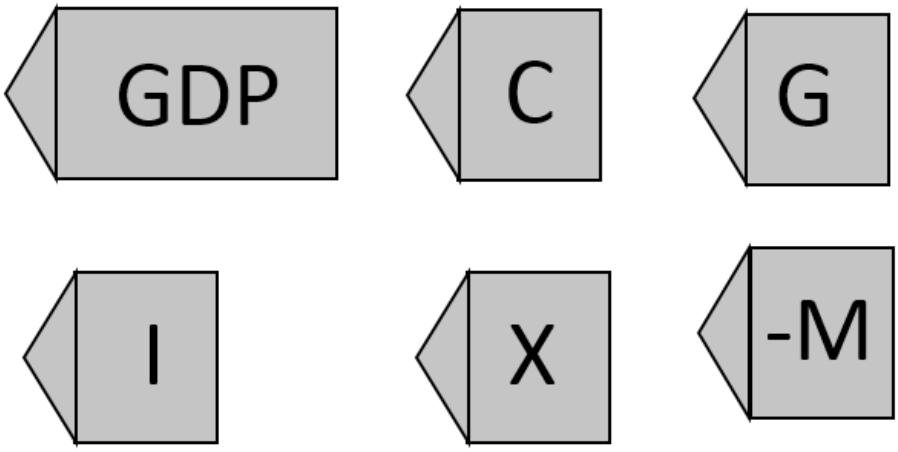
Prompt #6: Local government purchases new office furniture for an office building for $25,000; the office furniture was produced in the United States.

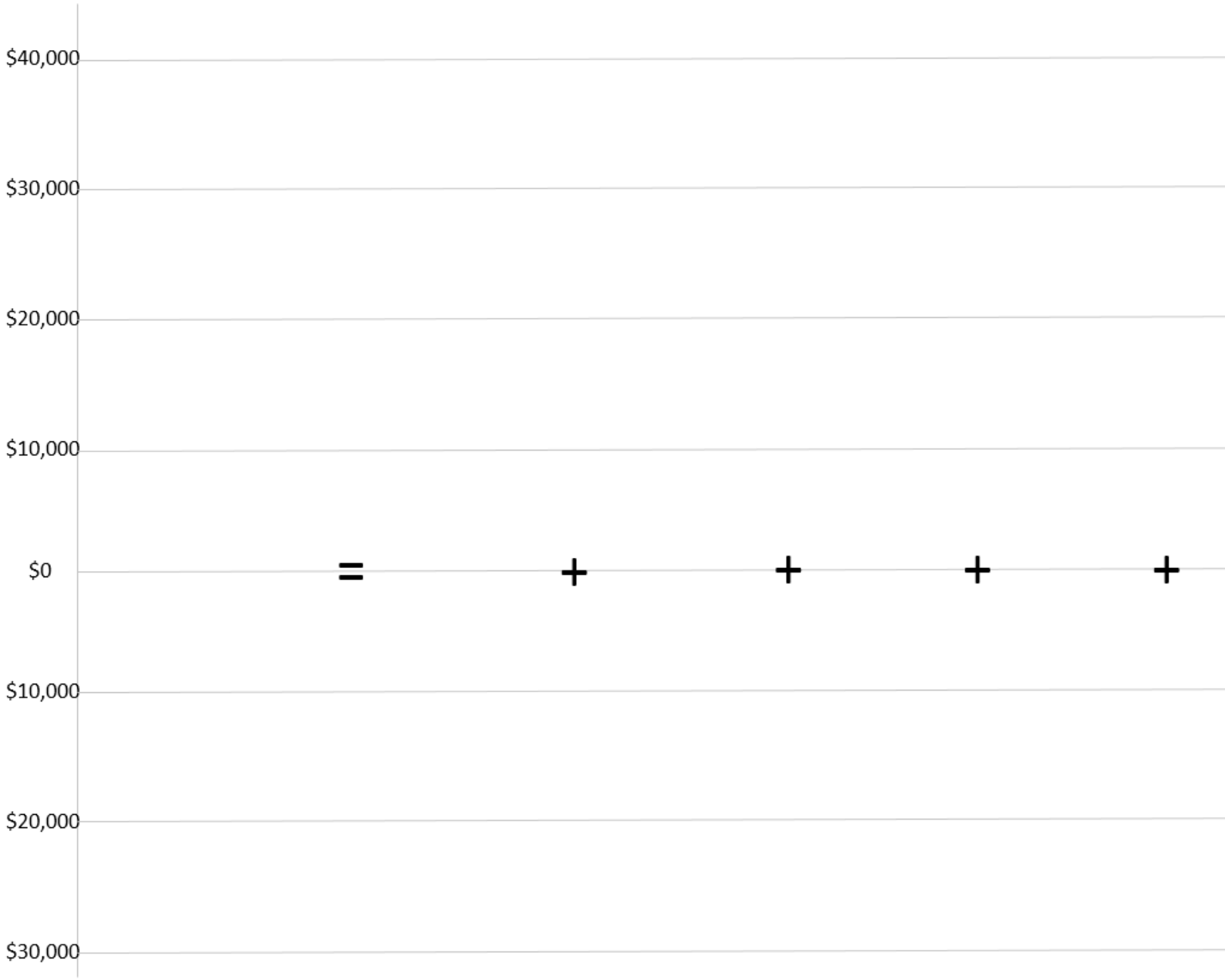
Answer: Both Government Purchases (G) and GDP increase by $25,000.



Appendix B

Activity 2: Materials for Net Exports Activity

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