**GAO**

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# INTERNATIONAL REMITTANCES

# Actions Needed to Address Unreliable Official U.S. Estimate

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## Why GAO Did This Study

For many countries, remittances represent a large and stable source of foreign currency. Remittances have received increasing attention from policymakers as the volume of funds transferred has increased over the years. Despite the global significance of remittances, much remains unknown about the actual volume of remittances and the methods used to remit them. GAO was asked to study the potential effects of a fine on certain remitters and estimates of U.S. remittances. GAO examined (1) the potential effects of a fine on remitters unable to provide proof of legal immigration status, and (2) BEA's remittance estimate and the extent to which its revised estimation methodology met government-wide policies and best practices. GAO constructed a hypothetical scenario analysis to show the uncertainty associated with the effects of a fine. GAO interviewed, among others, BEA, International Monetary Fund and World Bank officials, and researchers. GAO also analyzed BEA's estimate of U.S. remittances and documentation of its methodologies.

## What GAO Recommends

GAO recommends that BEA conduct analyses to improve the reliability of its estimate and follow established policies for documenting its methods and analyses. BEA agreed to implement the recommendations but disagreed that its estimates are unreliable and not adequately documented. GAO disagrees and maintains that BEA's revised estimation model produces unreliable estimates and BEA could not provide adequate documentation of its methodology.

View GAO-16-60. For more information, contact Alicia Puente Cackley at (202) 512-8678 or cackleya@gao.gov.

## What GAO Found

The Remittance Status Verification Act of 2015, S. 79, would require remittance transfer providers to request that all senders of remittances to recipients outside the United States provide proof of their legal status under U.S. immigration laws and impose a fine on those unable to provide such proof. The funds collected would be submitted to the Consumer Financial Protection Bureau (CFPB) to pay for its administrative and enforcement costs in carrying out the act, and any remaining funds would be used to pay expenses related to border protection. The fine may raise money for border protection, but the exact amount is unknown and would depend on several factors, including

- the dollar amount of remittances sent by those without legal status,
- changes in remitter behavior due to the fine, such as using unregulated transfer methods, and
- CFPB's administrative and enforcement costs to carry out the act.

The first two factors above affect the volume of remittances that would be subject to a fine. The third factor affects the amount of net revenue from the fine remaining for border protection. Finally, remittance transfer providers told GAO that the fine could have consequences for them, including potentially disproportionate costs for small providers.

The Bureau of Economic Analysis (BEA) estimated that remittances from the United States were approximately $40 billion in 2014. However, BEA's methodology for estimating remittances is not consistent with government-wide policies and guidance on statistical practices or with BEA's own best practices and thus produces unreliable estimates. GAO identified several weaknesses in BEA's estimation methodology, illustrated by the following examples.

- BEA failed to use appropriate methodology that addressed questionable aspects of the data, such as missing information and measurement problems. This is inconsistent with National Research Council of the National Academies of Science guidelines for federal statistical agencies and government-wide policies.
- BEA also calibrated the output of the new model to match the estimate produced by BEA's previous model. BEA did this because according to officials the new model produced substantially lower results than BEA had previously estimated. In a 2006 report GAO had questioned the reliability of BEA's previous model; as a result BEA's actions raise further concerns about the reliability of the new model's results.

Moreover, BEA could not provide adequate, transparent documentation underlying its methodology or reviews of its methods and data. According to BEA officials, BEA did not adhere to its own best practices for changing its methodology because they did not consider the remittance estimate to be influential information. However, BEA's estimate is influential, as it is cited by national and international organizations and in some cases is incorporated into the estimates of these organizations, including the World Bank.

# Contents

**Abbreviations**

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| ACS | American Community Survey |
| AML | anti-money laundering |
| BEA | Bureau of Economic Analysis |
| BSA | Bank Secrecy Act |
| Census Bureau | United States Census Bureau |
| CFPB | Consumer Financial Protection Bureau |
| Commerce | Department of Commerce |
| CPS | Current Population Survey |
| Dodd-Frank Act | Dodd-Frank Wall Street Reform and Consumer Protection Act |
| EFTA | Electronic Fund Transfer Act |
| FCSM | Federal Committee on Statistical Methodology |
| FinCEN | Financial Crimes Enforcement Network |
| IDB | Inter-American Development Bank |
| IARIW | International Association for Research in Income and Wealth |
| IMF | International Monetary Fund |
| IQA | Information Quality Act |
| MESC | Modernization and Enhancement Steering Committee |
| NRC | National Research Council |
| OECD | Organization for Economic Co-operation and Development |
| OMB | Office of Management and Budget |
| $R^2$ | R-squared |
| Treasury | Department of the Treasury |

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February 16, 2016

The Honorable David Vitter
United States Senate

The Honorable Tom Price
Chairman
Committee on the Budget
House of Representatives

The United States is the largest remittance sending country in the world with an estimated $54.2 billion sent in 2014, according to the World Bank.[1] For many receiving countries, remittances are the largest source of foreign currency, often amounting to more than official foreign assistance from international aid organizations and developed countries such as the United States. These transfers are generally considered a stable source of funds for receiving countries.

In a March 2006 report we examined various methods of estimating remittances from the United States and found that different methodologies had resulted in a range of estimates.[2] We reviewed the model that the Bureau of Economic Analysis (BEA) used to estimate U.S. remittance flows and found that the estimate was uncertain because of issues with the quality and timeliness of the data.

According to the International Monetary Fund (IMF), remittances have received increasing attention from policymakers in many nations and international organizations as the volume of funds transferred has grown over the years. However, despite their global and economic significance,

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[1]The World Bank, *World Development Indicators: Movement of People Across Borders,* 2014. The World Bank defines personal remittances as the sum of personal transfers and compensation of employees. Personal transfers represent all current transfers in cash or in kind made between resident and nonresident individuals. Compensation of employees represents the income of border, seasonal, and other short-term workers who are employed in an economy where they are not residents and of residents employed by nonresident entities.

[2]GAO, *International Remittances: Different Estimation Methodologies Produce Different Results*, GAO-06-210 (Washington, D.C.: March 2006).

much remains unknown about the actual volume of remitted funds and the methods used to remit them. Concerns about the reliability and consistency of remittance estimates from the Group of Eight and other international observers have led to the creation of a guide that aims to substantially improve the quality of remittance data.[3] In 2009, the Luxembourg Group on Remittances, which included representatives from the IMF, World Bank, Organization for Economic Co-operation and Development (OECD), Eurostat and national statistical offices and central banks from countries around the world, produced detailed guidance that includes recommendations for best practices in collecting information about and estimating remittances.[4]

In January 2015, the Remittance Status Verification Act of 2015 was introduced in the U.S. Senate.[5] The proposed legislation would amend the Electronic Fund Transfer Act (EFTA) to require remittance transfer providers to request that all senders of remittance transfers to recipients outside of the United States provide proof of their legal status under the immigration laws.[6] The proposed legislation would require remittance

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[3]The Group of Eight is a governmental political forum of industrial economies, including Canada, France, Germany, Italy, Japan, the United States, and the United Kingdom, as well as other countries in the European Union.

[4]International Monetary Fund, *International transactions in remittances: guide for compilers and users* (Washington, D.C.: 2009).

[5]S. 79, 114th Cong. (1st Sess. 2015).

[6]In 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) amended EFTA to add a new legal framework for remittance transfers. Pub. L. No. 111-203, § 1073, 124 Stat. 1376, 2060 (2010) (codified at 15 U.S.C. § 1693o-1). The Dodd-Frank Act also transferred most rulemaking authority, including that related to remittance transfers, under EFTA from the Board of Governors of the Federal Reserve (Federal Reserve Board) to the Consumer Financial Protection Bureau (CFPB). CFPB amended Regulation E, under EFTA, to implement the requirements for remittance transfers. Regulation E requires remittance transfer providers to make certain disclosures to senders of remittance transfers, including, among other things, a pre-payment disclosure containing such information as fees, taxes and exchange rates. 12 C.F.R. § 1005.31(b). Regulation E also includes specific procedures to be followed in the event of an error. *See* 12 C.F.R. § 1005.33. A remittance transfer provider is generally defined as any person that provides remittance transfers for a consumer in the normal course of its business, regardless of whether the consumer holds an account with such person. *See* 12 C.F.R. § 1005.30(f). A remittance transfer is generally defined as the electronic transfer of funds requested by a sender (defined as a consumer in a state who primarily for personal, family, or household purposes requests a remittance transfer provider to send a remittance transfer) to a designated recipient that is sent by a remittance transfer provider, and does not include transfers in the amount of $15 or less among other exclusions. 12 C.F.R. § 1005.30(e).

transfer providers to impose a fine on any sender unable to provide proof of immigration status and would also include a provision for GAO to study the act's effects. In states that require proof of legal residence, acceptable documentation for showing proof of legal status under the proposed law would include a state-issued driver's license or federal passport, or the same documentation as required by the state for proof of identity for the issuance of a driver's license or as required for a federal passport.[7] For those states that do not require proof of legal residence, under the proposed law the Consumer Financial Protection Bureau (CFPB) would define by rule what constitutes acceptable documentation of proof of legal status.

Each remittance transfer provider would be required to impose on any sender unable to provide proof of legal immigration status a fine equal to 7 percent of the dollar amount to be transferred, excluding any fees or other charges imposed by the remittance transfer provider. The provider would then be required to submit all fines imposed and collected to CFPB to pay for the administrative and enforcement costs to CFPB of carrying out the act. Any funds remaining after paying for such costs would be transferred by CFPB to the Department of the Treasury (Treasury) to be used to pay expenses relating to U.S. Customs and Border Protection for border security fencing, infrastructure, and technology. The bill was referred to the Committee on Banking, Housing, and Urban Affairs on January 7, 2015.

You asked that we consider the potential effect on remitters and providers of the proposed Remittance Status Verification Act and the potential revenue the proposed act would generate, and that we update our previous work on estimates of remittances from the United States. This report (1) discusses the potential effects of assessing a fine on remitters unable to provide proof of legal U.S. immigration status, and (2) examines BEA's remittance estimate and the extent to which its revised estimation methodology met government-wide policies and agency best practices.

To discuss the potential effects of assessing a fine on remitters unable to provide proof of U.S. immigration status, we summarized estimates of the number of immigrants without legal status from federal agencies and

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[7]A Matrícula Consular de Alta Seguridad (Consular Identification Card), issued by the Government of Mexico to its nationals residing outside of Mexico, would not constitute acceptable documentation under the proposed law.

research organizations, including the Department of Homeland Security (DHS), Pew Research Center, and Center for Migration Studies (CMS). Collectively, DHS, Pew Research, and CMS are primary sources for the estimates of immigrants without legal status in the United States, according to researchers we interviewed. We used these sources to identify the size of the potentially affected group of immigrants without legal status. We also reviewed laws and regulations relevant to remittance transfer providers and interviewed providers. We spoke with regulators, including CFPB and the Financial Crimes Enforcement Network (FinCEN), and two industry associations to obtain their perspectives on compliance with the requirements of S. 79, should it become law.

In addition, we judgmentally selected a cross-section of remittance transfer providers that included five nondepository remittance transfer providers and four depository institutions based on a number of factors, including the volume of remittances and diversity of countries serviced. We interviewed academic researchers with expertise in remittances and immigration to the United States. Finally, we constructed a set of hypothetical scenarios using factors that would affect the amount of revenue generated for border protection. We varied the following factors to highlight the uncertainty associated with estimates of net revenue from the fine: dollar amounts of remittances sent by immigrants without legal status, the percentage reduction in remittances in response to the fine, and administrative and enforcement costs associated with the fine. Together, these three factors demonstrate the wide variation in potential net revenue from the fine. We found insufficient literature upon which to base the values given to each factor, therefore dollar amounts or percentages in our scenario analysis are hypothetical.

To describe BEA's estimate of remittances from the United States, we collected published estimates of personal transfers attributable to BEA. To examine BEA's current estimation methodology, we reviewed BEA documentation, including components of its model, and interviewed BEA officials. We obtained documentation on the Census Bureau's (Census) American Community Survey (ACS) and Current Population Survey (CPS) data to understand how they were used in BEA's remittance estimation methodology and interviewed Census officials familiar with the surveys. As described in this report, we found that results from BEA's estimation model are unreliable.

To obtain a variety of views about remittance estimation, including the challenges involved, we interviewed officials from Inter-American

Development Bank (IDB), IMF, World Bank, and selected central banks from among the top 10 recipient countries of U.S. outflows that use a formal methodology to track remittance inflows or outflows on at least an annual basis, including Mexico and the Philippines.

We conducted this performance audit from October 2014 to February 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Background

The United States is home to more immigrants than any other country in the world.[8] Census estimated that 41 million foreign-born individuals resided in the United States from 2010 through 2014, making up 13 percent of the population.[9] According to the World Bank, the United States is also, by far, the largest source of remittances from foreign-born residents to their home countries, including Mexico, China, India, and the Philippines, among others (see fig. 1).

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[8]See Phillip Conner, D'Vera Cohn, Ana Gonzalez-Barrerra, and Russ Oates, *Changing Patterns of Global Migration and Remittances* (Washington, D.C.: Pew Research Center, 2013).

[9]United States Census, *Selected Characteristics of the Native and Foreign-Born Populations, 2010-2014, American Community Survey 5-year Estimates*, accessed December, 11, 2015, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S0501&prodType=table.

**Figure 1: Remittances Sent from the United States to Major Receiving Countries in 2014**

**U.S. dollars** (in millions)



Countries
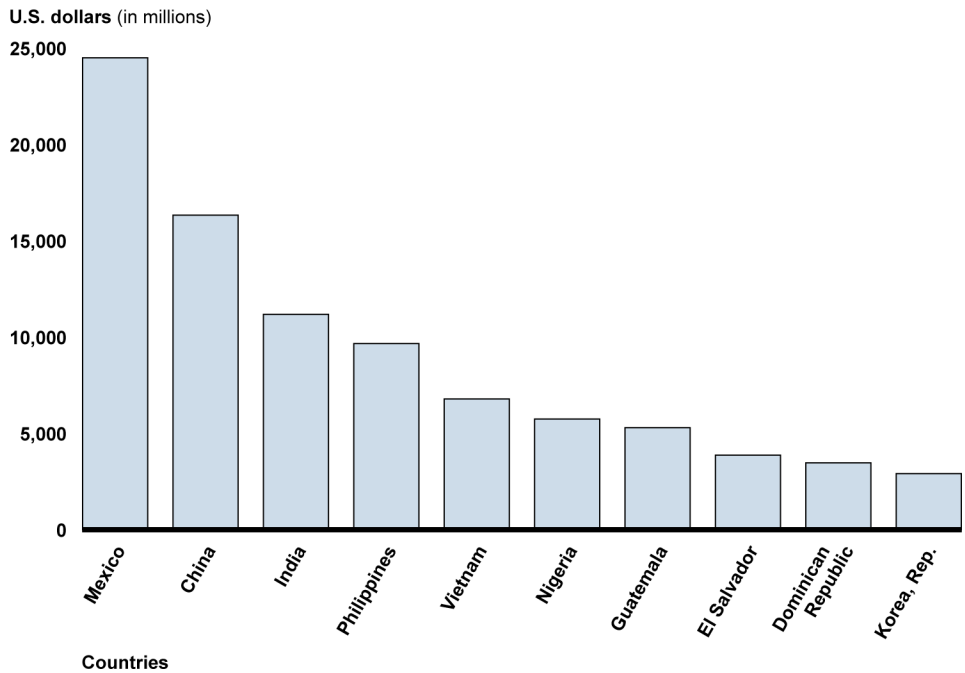
Source: GAO analysis of World Bank's Bi-lateral Remittance Matrix: United States outflows, 2014. | GAO-16-60

Note: According to the World Bank, the remittance amounts in the bilateral remittance matrix are unofficial estimates designed to capture country-specific, disaggregated bilateral remittance estimates and have been published by the Migration and Remittances program office since 2010. In contrast to the World Bank's official remittance estimates, the World Bank's bilateral remittance estimates use a different methodology, and have higher remittance estimate totals per country. World Bank bilateral remittance data for 2014 are disaggregated using host country and origin country incomes and estimated migrant stocks from 2013.

Remittance funds can be used for basic consumption, housing, education, and small business formation and can promote financial development in cash-based economies. In a number of developing economies, remittances have become an important and stable source of funds that exceeds revenues from exports of goods and services and financial inflows from foreign direct investment.

Remittances can be sent through formal transfer systems and informal methods. Formal systems typically include banks, credit unions, money transfer businesses such as wire services, and postal services. In the United States, providers of remittance transfer services (including bank and nonbank institutions) are subject to federal oversight and, depending on the state in which they operate, can be subject to supervision by

states.[10] According to CFPB, nonbank remittance transfer providers sent an estimated 150 million individual transfers from the United States in 2012. Informal remittance transfer methods include hand-carried cash, courier services, and agents known as hawalas.[11]

Individuals can transfer remittance funds in several ways, such as

1.  cash payments to individuals and bank accounts;

2.  prepaid debit or credit cards; and

3.  online and through mobile devices.

Global remittance estimates are published annually by some international organizations on an annual basis. IMF collects data on components of remittances submitted by its member countries, including the United States, as part of its annual publication of balance of payments statistics.[12] IMF's *Balance of Payments and International Investment Position Manual* provides a framework for identifying individual remittance flows that benefit households. According to IMF, this framework can be applied by all countries and should lead to some level of comparability among them. The World Bank uses IMF statistics to produce an annual Migration and Remittances Factbook and monthly and annual remittances data on its website.[13] Other international organizations, such as the IDB through the Multilateral Investment Fund, also produce annual reports on

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[10]We discussed the oversight and supervision of banks and nonbank remittance transfer providers, as it relates to anti-money-laundering requirements, in a recently issued report. See GAO, *International Remittances: Money Laundering Risks and Views on Enhanced Customer Verification and Recordkeeping Requirements*, GAO-16-65 (Washington, D.C.: Jan.15, 2016).

[11]Hawalas make up an informal value transfer system for transferring money that is often used in places where formal financial transactions are unavailable, expensive, or unreliable. Senders pay money to an agent, who then instructs a remote associate to pay the final recipient.

[12]The sixth edition of the *Balance of Payments and International Investment Position Manual* serves as the standard framework for statistics on the transactions between a country's economy and the rest of the world.

[13]The data published by the World Bank is not fully consistent with the *Balance of Payments and International Investment Position Manual*, and therefore, caution should be taken in comparing different data sets. The World Bank's most recent official data on remittances and other resources are available at http://www.worldbank.org/en/topic/migrationremittancesdiasporaissues/brief/migration-remittances-data.

remittance estimates. In the United States, BEA is responsible for compiling the official U.S. estimates. Other nations may delegate the official estimation of remittances to central banks or specific government agencies.

In response to requests from policymakers, remittance data compilers, and other data users, IMF and the World Bank published a guide for compilers and users of remittances data.[14] The purpose of the guide is to promote lasting improvements in remittances data, which it seeks to accomplish by summarizing the definitions and concepts related to the balance of payments framework and by providing practical compilation guidance. Two items in the guide that substantially relate to remittances are "personal transfers" and "compensation of employees," both of which countries are required to report to IMF. Personal transfers are a measure of all transfers in cash or in kind made or received by resident households to or from nonresident individuals and households. Compensation of employees is a measure of the income of short-term workers in an economy where they are not resident and of the income of resident workers who are employed by a nonresident entity. The guide also defines additional measures related to remittances, which countries are encouraged but not required to report. For example, personal remittances represent the sum of personal transfers, net compensation of employees, and capital transfers between households, according to the guide.[15]

Institutions use different methodologies to produce estimates of remittances. For example, BEA uses demographic and household survey data and a model that calculates the remittance rates by demographic group to create the official estimate of remittances from the United States. The World Bank has developed its own methodology to create remittance estimates. Its research group produces country-specific development indicators and international development statistics. The World Bank then complements these data with information from the IMF's *Balance of Payments and International Investment Position Manual* to create annual and semi-annual remittance estimates.

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[14]International Monetary Fund, *International transactions in remittances: guide for compilers and users* (Washington, D.C.: 2009).

[15]The guide defines net compensation of employees as the compensation of employees less (1) taxes and social contributions paid by nonresident workers in the economy of employment and (2) transport and travel expenditures related to working abroad.

Since 2010, researchers at the World Bank have also used United Nations population data to develop a bilateral migration matrix, which provides a second set of country-specific bilateral remittance estimates—that is, estimates between sending and receiving countries. These estimates are based on the number of migrants in different destination countries and estimates of how changes in the income of migrants influence the remittances they send. IDB's Multilateral Investment Fund has a different methodology, using estimates reported by central banks to IMF as a baseline for individual country estimates. The Multilateral Investment Fund then works with the Center for Latin American Monetary Studies to help refine remittance estimates for selected countries in the Latin America and Caribbean region.

Finally, some central banks use a combination of methods to estimate remittances. The central bank of Mexico, known as Banco de México, tracks remittance flows to Mexico with the help of regulatory reporting requirements on money transmitters. Since 2003, Mexico's methodology for estimating remittances has required firms that receive remittances to report, on a monthly basis, the amount of money received and the number of transactions conducted between the United States and Mexico. To track remittances through informal channels, such as couriers that fall outside this regulatory framework, Banco de México conducts a survey at the U.S.-Mexico border of Mexicans entering the country. The central bank of the Philippines, known as Bangko Sentral Ng Pilipinas, estimates remittances that are channeled through banks. The Philippine government also has established a formal program for registering and tracking overseas Filipino workers. This program provides data to the government on the type of employment these workers obtain as well as their salaries. The Bangko Sentral Ng Pilipinas also uses the *Survey of Overseas Filipinos* to supplement data from the program. Using these two approaches, Bangko Sentral Ng Pilipinas is able to identify remittance funds sent by Filipinos overseas through friends and relatives and amounts brought in when these workers return home.

## Potential Effect of a Fine on Remitters without Legal Status Is Uncertain and Depends on a Variety of Factors

A proposed fine on immigrants unable to show proof of legal status who send money through remittance transfer providers covered under EFTA could raise money for border protection, but the potential amount of revenue to be generated is unknown. Net revenue from the fine—the total of all fines collected less CFPB's administrative and enforcement costs—would depend on several key factors, namely the dollar amount of remittances sent by those without legal immigration status, changes in remitter behavior because of the fine, including a potential reduction in remittances through regulated providers, and the cost of enforcement. For example, the ability to raise money depends on a significant number of individuals without legal status using regulated remittance transfer providers and paying the fine. However, a fine could result in a decrease in remittances in the regulated market and an increase in remittances through informal methods of money transfer. The revenue raised by the proposed fine would first be used to pay CFPB for enforcement costs. We did not identify any estimates of the administrative and enforcement costs associated with the fine. Our hypothetical scenario analysis illustrates the sensitivity of potential net revenue estimates to these factors. CFPB and other federal regulators would enforce the requirements of the proposed legislation and CFPB identified some implementation challenges. Lastly, providers told us the fine could have consequences for them, and one provider said that smaller providers would likely be affected the most.

## Several Factors Could Affect the Amount of Revenue Generated from a Proposed Fine on Remitters without Legal Status, as Hypothetical Scenarios Show

A fine could potentially generate net revenue for border control, but the following selected factors would influence the actual amount:

- The dollar amount of remittances sent by those without legal immigration status. The revenue raised by the fine would depend on the dollar amount of remittances sent by those individuals in the United States without legal immigration status and, specifically by those using regulated remittance transfer providers. According to three studies we identified during discussions with experts, estimates of unauthorized U.S. immigrants in 2012 ranged from 11.1 million to

11.4 million people.[16] Of that number, only those who conduct transactions through providers that are subject to EFTA would actually pay a fine, should they continue to use such providers, and that number is unknown.

- The response to the fine by individuals in the United States without legal status, including a reduction in remittances through regulated providers. If individuals without legal status respond to the fine by making money transfers that may not be subject to EFTA requirements, by remitting less, or leveraging connections with immigrants with legal status, the amount of revenue raised by the fine would be lower. Representatives from almost all of the organizations we spoke with, including providers, researchers, federal agencies, and community groups, stated that remitters without legal status may be deterred by the fine and the additional scrutiny around their immigration status. The amount of revenue generated by the fine would also depend on the extent to which those without legal immigration status continue to use regulated systems after the fine is imposed instead of switching to informal methods, such as hawalas. Two articles identified in our literature search noted that those without legal status may use methods that allow them to maintain a higher degree of anonymity. For example, those without legal immigration status may have relatives or friends who are authorized to be in the

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[16]See Jeffrey S. Passel and D'Vera Cohn, *Unauthorized Immigrant Totals Rise in 7 States, Fall in 14* (Washington: D.C: Pew Research Center, 2014); Bryan Baker and Nancy Rytina, *Estimates of the Unauthorized Immigrant Population Residing in the United States*, Population Estimates, Policy Directorate (Washington, D.C.: U.S. Department of Homeland Security, Office of Immigration Statistics, 2013); and Robert Warren, "Democratizing Data about Unauthorized Residents in the United States: Estimates and Public-Use Data, 2010-2013," *Journal on Migration and Human Security*, vol. 2, no. 4 (Center for Migration Studies, 2014), 305-328. More recent estimates of unauthorized residents in the United States are available from the Pew Research Center and the Center for Migration Studies, which report 11.3 million and 10.9 million in 2014, respectively. See Jeffrey S. Passel and D'Vera Cohn, Unauthorized Immigrant Population Stable for Half a Decade (Washington, D.C: Pew Research Center, 2015), accessed on February 9, 2016, http://www.pewresearch.org/fact-tank/2015/07/22/unauthorized-immigrant-population-stable-for-half-a-decade/; and Robert Warren, "US Undocumented Population Drops Below 11 Million in 2014, with Continued Declines in the Mexican Undocumented Population," *Journal on Migration and Human Security*, vol. 4, no. 1 (Center for Migration Studies, 2016), 1-15.

United States send remittances for them, potentially lowering the amount of revenue raised by a fine.[17]

Conversely, if most remitters continue to remit the same amount, and continue to remit through regulated channels, the total amount remitted may remain stable, and more revenue will be raised. Research experts, officials from industry, community groups, and some federal agencies with which we spoke suggested that some remitters unable to provide proof of legal status may send the remittance and pay the fine, but the exact percentage is unknown. While the effect of the fine depends heavily on the remitting behavior of individuals without legal immigration status and their response to the fine, limited information exists on how many of these individuals remit or the extent to which they rely on regulated methods.[18] In the absence of definitive studies on remitting behavior, the

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[17]For information on the use of informal networks by immigrants without legal status, see Catalina Amuedo-Dorantes, Cynthia Bansak, and Susan Pozo, "On the Remitting Patterns of Immigrants: Evidence from Mexican Survey Data," *Economic Review*, Federal Reserve Bank of Atlanta, vol. 90, no. 1 (2005); and Raúl Hernández-Coss, "The U.S.–Mexico Remittance Corridor: Lessons on Shifting from Informal to Formal Transfer Systems" (working paper, Series No. 47, Washington, D.C.: 2005).

[18]For example, one researcher suggested that if individuals are willing to cross the border without legal status, then they might be willing to use transfer systems that are not regulated. Similarly, two articles from our review of the literature suggest that not having legal status may also raise the demand for informal transfer services, given a desire to remain in the country undetected by public authorities. On the other hand, transferring money safely to family members abroad may be so important that immigrants may send money using regulated providers, even if doing so results in higher costs. Amuedo-Dorantes, Bansak, and Pozo, "On the Remitting Patterns of Immigrants: Evidence from Mexican Survey Data," and Hernández-Coss, "The U.S.–Mexico Remittance Corridor Lessons on Shifting from Informal to Formal Transfer Systems."

extent to which immigrants use regulated or informal methods for remitting and how they will respond to price increases is unknown.[19]

If the costs of the fine, including costs for providers to implement the requirements of the proposed legislation, are passed on to the remitter in the form of a price increase, remitters might reduce the amounts or the frequency with which they remit. Information on price sensitivity—how senders respond to an increase in price—is limited. According to a CFPB report and a remittance transfer provider with whom we spoke, remitters' response to higher prices may partly depend on knowledge of other available options, including access to information about fees charged by other providers.[20] Behavioral changes could substantially limit the amount of revenue generated for border protection.

- Administrative and enforcement costs associated with the fine. Although the regulatory costs associated with the proposed legislation are unknown, CFPB officials told us that the agency would incur expenses associated with implementing the legislation and ensuring compliance. According to CFPB, these expenses would include the costs of developing rules, examining remittance transfer providers, and cooperating with other federal agencies on enforcement actions against noncompliant institutions. Other federal regulators also enforce EFTA for their regulated entities, and state regulators also may play a role in oversight of remittance transfer providers. As the revenue for the fine would be used first to reimburse CFPB for

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[19]For example, our search of the literature found one study on price sensitivity for remittances from the United States, which was limited to remittances sent to El Salvador and Guatemala. With regard to the likelihood of remittances, one study of Mexican migrants finds that unauthorized immigrants are more likely to remit, while another study of African migrants to Organization for Economic Co-operation and Development countries finds that unauthorized migrants are less likely to remit. For the study on price sensitivity, see Kate Ambler, Diego Aycinena, and Dean Yang, "Remittance Responses to Temporary Discounts: A Field Experiment Among Central American Migrants" (working paper 20522, Massachusetts, National Bureau of Economic Research, 2014). For the study on whether migrants from Mexico without legal status are more likely to remit, see Amuedo-Dorantes, Bansak, and Pozo, "On the Remitting Patterns of Immigrants: Evidence from Mexican Survey Data." And for the contribution of legal status on remittances by African migrants, see Albert Bollard, David McKenzie, and Melanie Morten, "The Remitting Patterns of African Migrants in the OECD," (working paper 5260, Washington, D.C.: World Bank, April 2010).

[20]Consumer Financial Protection Bureau, *Report on remittance transfers: Report to the President, the Senate Committee on Banking, Housing, and Urban Affairs, and the House of Representatives Committee on Financial Services* (Washington, D.C.: 2011).

administrative and enforcement costs to carry out the proposed legislation, high costs to CFPB for these activities would mean less net revenue available for border protection.[21] Uncertainty in these costs would contribute to uncertainty in how much revenue remains for border protection.
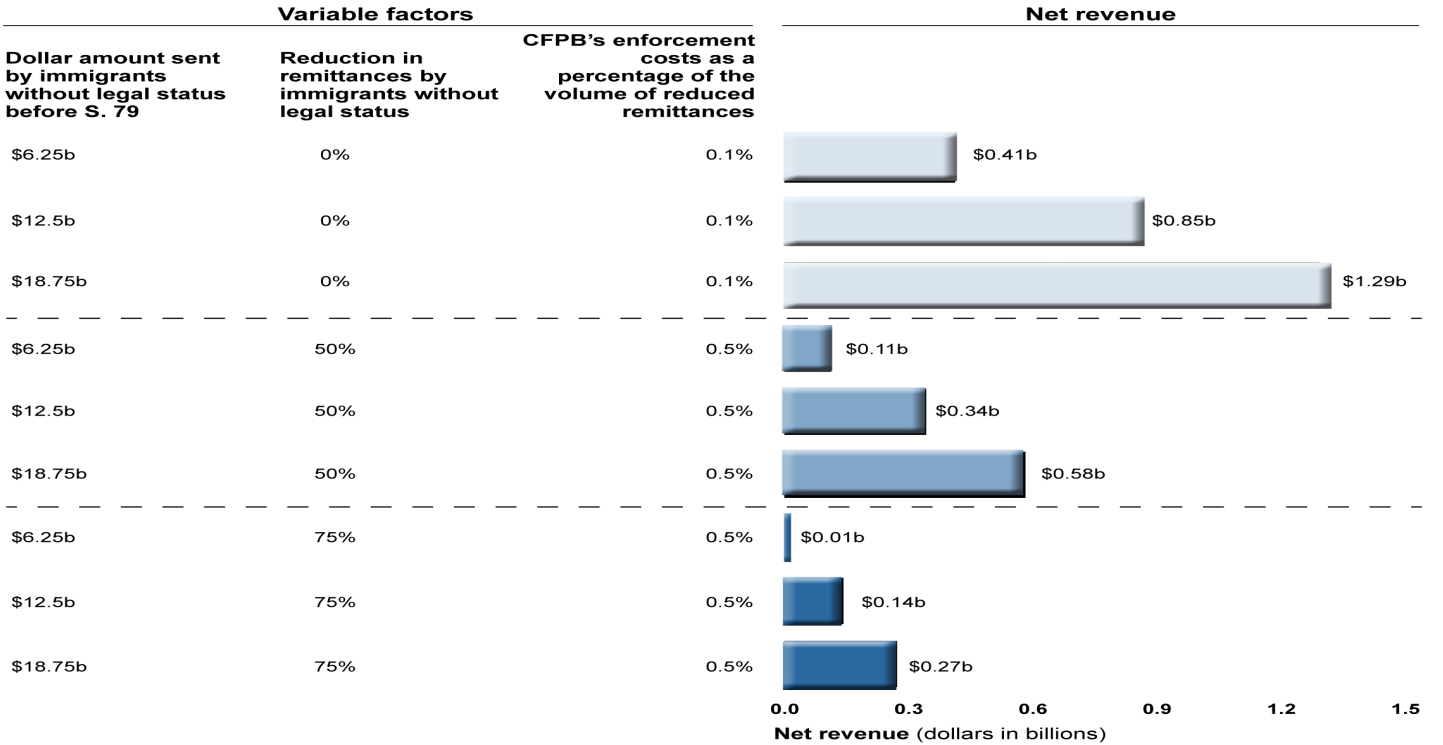
Given the uncertainty related to these important factors, we constructed a scenario analysis to illustrate how the revenue generated for border protection could vary based on the values we assume for the following, given our starting assumptions about the total volume of remittances and proportion of those in the formal sector:

1. the dollar amount of remittances sent by immigrants without legal status,

2. the reduction in remittances through regulated providers in response to the request to show proof of legal status or pay a fine, and

3. the magnitude of administrative and enforcement costs to CFPB.

The scenarios are hypothetical because the factors used to generate the results were selected solely to demonstrate the uncertainty in how much revenue would be collected. They are not supported by empirical research or evidence. The selected scenarios we illustrate are from a larger number that we analyzed to examine how sensitive net revenue from fines is to the factors. The three factors shown in figure 2 illustrate the potentially wide variation in net revenue from fines. In our analysis, we begin by assuming that the total volume of remittances is $50 billion and 50 percent of the total volume of remittances is sent through regulated providers. The scenario analysis varies the three factors above, thereby demonstrating the breadth of uncertainty in potential net revenue.

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[21]Because it would amend EFTA, the proposed legislation would fall under the supervision and enforcement authority of other federal regulators, in addition to CFPB, depending on the institution being supervised or enforced against. CFPB generally has the authority to supervise very large banks and credit unions, as well as certain nonbank entities (including those currently defined by rule to be nonbank international money transfer providers that send at least one million international money transfers annually), for compliance with federal consumer financial law, including EFTA. Enforcement authority under EFTA depends on the institution. *See* 15 U.S.C. § 1693o(a). The proposed legislation, however, does not provide that any funds obtained from the fine would go to any of the other federal regulators.

**Figure 2: Varying Selected Factors and Their Potential Effect on Revenue for Border Protection—A Hypothetical Scenario Analysis of the Proposed Legislation (S. 79)**

| Variable factors | | | Net revenue |
|---|---|---|---|
| **Dollar amount sent by immigrants without legal status before S. 79** | **Reduction in remittances by immigrants without legal status** | **CFPB's enforcement costs as a percentage of the volume of reduced remittances** | |
| $6.25b | 0% | 0.1% | $0.41b |
| $12.5b | 0% | 0.1% | $0.85b |
| $18.75b | 0% | 0.1% | $1.29b |
| $6.25b | 50% | 0.5% | $0.11b |
| $12.5b | 50% | 0.5% | $0.34b |
| $18.75b | 50% | 0.5% | $0.58b |
| $6.25b | 75% | 0.5% | $0.01b |
| $12.5b | 75% | 0.5% | $0.14b |
| $18.75b | 75% | 0.5% | $0.27b |

Net revenue scale: 0.0   0.3   0.6   0.9   1.2   1.5
**Net revenue** (dollars in billions)

Legend
CFPB - Consumer Financial Protection Bureau
Source: GAO analysis.  |  GAO-16-60

Note: All amounts and percentages in figure 2 are hypothetical and demonstrate the uncertainty of the amount of potential net revenue from the fine. We assumed $50 billion in remittances and 50 percent of remittances in the regulated market. We made additional assumptions that we vary in the figure above:

a) $6.25 billion, $12.5 billion, and $18.75 billion in remittances are sent by individuals without legal status before the implementation of S. 79; b) after implementation, remittances might decrease such that the dollar amount of remittances is significantly smaller; and c) CFPB's costs are a percentage—0.1 percent or 0.5 percent—of the volume of remittances that remain in the regulated market after the reduction in remittances sent by immigrants without legal status. To calculate net revenue, we assumed dollar amount sent by immigrants without legal status before S. 79, less the percentage reduction in remittances, then multiplied by the 7 percent fine, less CFPB's administrative and enforcement costs. Varying these three assumptions demonstrates the variability in potential net revenue. Assumptions not included here would result in other amounts of potential net revenue.

As figure 2 demonstrates, when the factors vary potential net revenue from fines can change significantly. For example, one scenario with no change in the amount of remittances and low administrative and enforcement costs could provide $0.41 billion in potential net revenue for border protection. In contrast, another scenario with a 75 percent reduction in remittances after the fine and high administrative and enforcement costs would generate potential net revenue of only $0.01 billion. In some cases, the cost incurred by CFPB could be more than the revenue from the fine. For example, a small dollar amount of remittances sent by immigrants without legal status, large reductions in remittances,

and high administrative and enforcement costs could lead to negative net revenue.[22] Obtaining reasonable estimates of net revenue would depend upon having accurate, reliable, and complete information on the amount immigrants without legal status remit and their response to a requirement for providers to request proof of legal status or assess a fine, as well as administrative and enforcement costs. In the absence of such information, the potential net revenue a fine would generate is unknown.

## Proposed Legislation Raises Other Issues for CFPB

Officials from CFPB noted that in addition to creating uncertainty about administrative and enforcement costs, the proposed legislation, if passed, would require CFPB to address other issues, including issuing new rules to define what constitutes proof of legal status and to establish procedures for submitting fines, as well as coordinating with other regulators.

- As noted earlier, CFPB would be required to define by rule what constitutes acceptable documentation in states that do not require proof of legal status to obtain a state-issued driver's license or a federal passport.
- CFPB would need to coordinate with other financial regulators. For example, the proposed legislation calls for remittance transfer providers to submit the fines to CFPB and for CFPB to then transfer to Treasury any remaining funds after the payment of CFPB's administrative and enforcement costs. However as noted previously, other federal regulators have the authority to enforce EFTA for the entities they supervise, including enforcing the remittance provisions against those supervised entities that are remittance transfer providers under the act. The proposed legislation would provide CFPB with rulemaking authority, but does not state how CFPB would coordinate with other agencies. CFPB staff told us that it might need

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[22]If CFPB incurred expenses that do not reduce proportionately with the volume of remittances, or the percentage of remittances not sent through regulated providers, then net revenue might be negative. For example, if the costs for rulemaking were large and subtracted from CFPBs expenses in the first year of implementation, then net revenue might be negative for that year.

to develop procedures with others on examination and enforcement efforts.[23]

- CFPB would be required to issue rules establishing the form and manner in which fines would be submitted to CFPB. CFPB staff told us that CFPB does not currently levy fines on consumers. Instead, CFPB levies monetary sanctions and brings other enforcement actions against consumer finance businesses and other persons in connection with violations of Federal consumer financial law. But CFPB staff noted that collecting fines directly from institutions for noncompliance is different from a fine on remitters collected by remittance transfer providers that is then submitted to the agency.
- Finally, CFPB may have examination authority over nonbank remittance transfer providers that also may be overseen by state regulators. If the proposed legislation were to become law, CFPB might have to coordinate with state regulators.

## A Requirement for Proof of Legal Status or Payment of a Fine Would Also Affect Providers

If remittances decrease because the number of transactions or amounts remitted decline, the fee revenue associated with remittance transactions that providers receive would decrease. Without any corresponding reduction in cost, the decrease in remittances might decrease profits for some providers, but by how much is uncertain. Prior experience with legislation passed in Oklahoma in 2009 may demonstrate effects similar to those that could result from the proposed legislation though there are some key differences between the two.[24] The Oklahoma law imposed a $5 fee on each wire transfer from a nondepository institution, and 1 percent of the amount of the transaction, if any, in excess of $500.[25] When making a transfer, all persons regardless of immigration status were required to pay the fee. Under the Oklahoma law, customers who paid the fee are entitled to an income tax credit equal to the amount paid when filing individual income taxes in Oklahoma with either a valid Social Security number or a valid taxpayer identification number. The tax credit

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[23]Other regulators with enforcement authority under EFTA include the National Credit Union Administration, the Federal Reserve Board, Office of the Comptroller of the Currency, Federal Deposit Insurance Corporation, the Department of Transportation, and the Securities and Exchange Commission. *See* 15 U.S.C. § 1693*o*(a).

[24]As mentioned earlier, according to many stakeholders, the proposed legislation may result in remitters without proof of legal status requesting others with proof of legal status to make remittances on their behalf, therefore leaving the level of remittances potentially unchanged.

[25]Okla. Stat. Ann. tit. 63, § 2-503.1j.

in effect means that those customers without a Social Security or taxpayer identification number are not eligible for the state income tax credit and therefore will have paid the remittance fee without being able to obtain a credit or refund.

Statements of four remittance transfer providers with operations in Oklahoma suggest that the law has had mixed effects. According to two providers, revenues decreased once the law was in place. Two providers told us that transaction activity in the state had fallen. One other provider stated that their company had still not recovered from the decline in revenue. This provider told us that the decreased number of transactions was the result of remittances that moved to out of state providers or from regulated to informal channels. The other two providers we interviewed noticed decreases in remittances, although they noted they did not have a large presence in Oklahoma. Also, one official from a state audit association noted that fee revenues for the State of Oklahoma continued to increase after the first year of the imposition of the fee.[26] Remittance transfer providers, industry associations, research experts, and some federal agencies we met with said that they expected to see revenues decrease in the regulated market if the proposed law (S.79) were passed, as it would send remittances to the informal market.

New proof-of-legal status requirements and fine collection could also increase remittance transfer providers' costs. Such potential costs were noted by almost all providers, and representatives from industry associations we spoke to. Several providers noted that they might need to pay for new computer infrastructure and databases, staff training, and compliance. One provider pointed out that just to add a new variable listing information on customers to an existing information system was a 9-month process that would involve testing and validation. Representatives of an industry association and one remittance transfer provider cited potential costs related to maintaining databases used to verify legal status.

Remittance transfer providers could also face increased compliance costs related to new requirements. In some cases, providers told us that compliance costs could be significant. For example, some providers said

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[26]All the statements here are based on testimonial evidence. If there were other factors that affected remittances at the same time that the legislation was passed, it would have been difficult to isolate the effect of the legislation on remittances without proper analysis.

that they had made significant investments to comply with the fee and exchange rate disclosures and other requirements implemented through amendments to Regulation E after the passage of the Dodd-Frank Act, such as developing procedures to electronically disclose the fees charged by the provider. Another provider said that it had spent more than $3 million on technology enhancements and customer service teams to satisfy the requirements of the rule. Still another provider noted that the company spent about 3 percent to 4 percent of its revenue on the legal compliance budget.

One representative of a transfer provider whom we interviewed said that the company might be able to incorporate compliance requirements into its Bank Secrecy Act (BSA)/anti-money-laundering (AML) efforts. BSA/AML requirements for institutions that provide money transfer services include, among other things, collecting sender identification for each transfer in the amount of $3,000 or more.[27] Banks are also required to implement a customer identification program, under which they establish procedures specifying what identifying information they will collect when customers open accounts.[28] However, other providers noted that collecting identification is not the same as verifying legal status. For example, several providers accepted the Matrícula Consular de Alta Seguridad, which is an official identity card that Mexican Consulates issue to nationals living outside Mexico. As previously discussed, under the Remittance Status Verification Act this card would not be an acceptable form of identification for proving legal status within the United States for purposes of the act. One provider we spoke with explained that not all states require proof of legal status before issuing a driver's license or other form of identification. Forms of identification that demonstrate legal status may vary from state to state. It could be difficult for money transfer clerks to know what form of identification to collect, particularly when remitters may hold identification from other states.

Some providers and one trade association also noted that the proposed legislation would require additional staff training. For example, one provider said that the company operated through many retail outlets, such as grocery stores and gas stations, and it would not be practical to train

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[27]*See* 31 C.F.R. § 1020.410(a) (recordkeeping requirements for banks); 31 C.F.R. § 1010.410(e) (recordkeping requirements for nondepository financial institutions).

[28]*See* 31 C.F.R. § 1020.220(a)(2).

all store clerks to determine the appropriate form of identification to show legal residency status. Another provider stated that it would be a significant challenge to train all agents—retail outlets that conduct transactions for the provider—on the documentation they would be responsible for collecting for proof of legal status. A trade association noted the difficulty and potential expense of training staff on how to properly check for proof of legal status; calculate, disclose, and collect the fine; and put the transaction in a database.

How much of the fine and added cost would be absorbed by the provider or retail outlet partly depends upon the competitiveness of the market. Remittance transfer providers stated that in competitive markets with a number of providers and a variety of methods for transmitting money, the demand for remittances is more sensitive to prices. For example, one provider indicated that it lost customers when its prices were only marginally higher than those charged by other providers. With the prospect of losing more customers and revenue, one provider with whom we spoke stated that it might choose to absorb some of the fine and added cost instead of passing it on. One provider we spoke with expected that the added costs would increase the costs passed on to consumers by 3 to 4 percentage points. If these costs were passed on in such a manner, all consumers, regardless of legal status, could experience an increase in the price of remittance transfers that are sent to a foreign country.

In addition, certain providers might be disproportionately affected by the requirements of the proposed legislation. According to representatives from two providers and a research expert, smaller providers generally operate at lower profit margins compared with larger providers.[29] Providers with lower margins would find it more difficult to absorb costs imposed due to the fine and may be more adversely affected with a reduction in revenues.

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[29]Profit margins represent the ratio of profits to sales revenue.

## BEA Does Not Follow Best Practices for Estimating Remittances, Leading to an Unreliable Estimate

BEA's estimate of remittances from the United States totaled approximately $40 billion in 2014, and its estimates of remittances generally increased from 2006 to 2014. BEA changed its remittance estimation methodology in 2012 in order to incorporate new data on reported remittances. However, BEA's methodology for estimating remittances is not consistent with government-wide policies and guidance on statistical practices or with BEA's own best practices and thus produces unreliable estimates. For example, BEA did not follow the guidelines from the National Research Council (NRC) of the National Academies stating that data releases from a statistical program should be accompanied by appropriate methods for analysis that take account of variability and other sources of error in the data.[30] In addition, we identified several errors in BEA's analysis that led us to question the reliability of BEA's estimates, including data that are censored, measurement and coding errors, and an estimation methodology that is subject to biases.[31] Further, BEA calibrated its new model to match the estimates from BEA's old model, whose accuracy we questioned in a March 2006 report on remittance estimates. On the basis of discussions with BEA officials, BEA's failure to follow best practices appears to be due to the fact that the agency does not consider its remittance estimates to be "influential information" that is subject to a high degree of transparency. However, BEA's estimate is cited by national and international organizations and in some cases is incorporated into the estimates of these organizations, including the World Bank.

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[30]National Research Council, *Principles and Practices for a Federal Statistical Agency: Fifth Edition* (Washington, D.C.: The National Academies Press, 2013), 18. The National Academies of Sciences, Engineering, and Medicine are private, nonprofit institutions that provide expert advice to the federal government. The principal statistical agencies of the federal government use this volume to guide their strategic planning, daily operations, and interactions with stakeholders. BEA is a signatory to the *Statement of Commitment to Scientific Integrity by Principal Statistical Agencies*, accessed November. 24, 2015, (https://www.bea.gov/_pdf/scientific_integrity_statement_of_the_principal_statistical_agencies.pdf), which identifies this NRC publication, among other documents, as the foundation for achieving and maintaining scientific integrity within and among the principal statistical agencies.

[31]Remittance data used by BEA are censored because for some households the value of reported remittances is only partially known. BEA also assigned all households within a given range of family income the same income leading to measurement errors to the extent that households within a given range of family income do not, in fact, have the same income. With these data limitations, the methodology adopted by BEA results in biased estimates for the remittance rates.

## BEA's Estimates of Remittances from the United States

BEA's estimate of remittances from the United States (which it reports as personal transfers) totaled approximately $40 billion in 2014. As figure 3 shows, BEA's estimates of remittances generally increased from 2006 to 2014.

**Figure 3: Bureau of Economic Analysis' Estimate of Total Volume of United States Personal Transfers (Outflows) as Reported to the International Monetary Fund, 2006-2014**
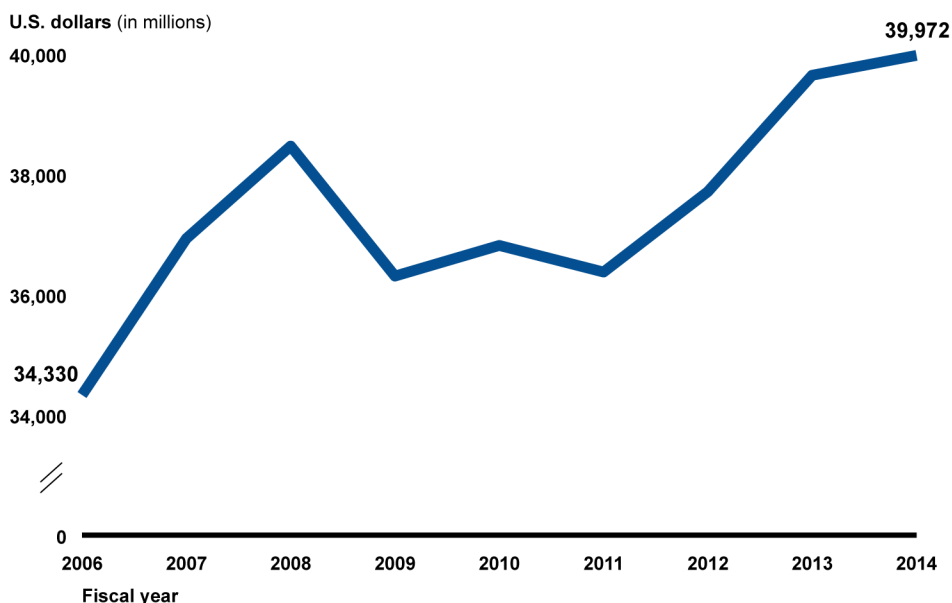


Source: GAO analysis of BEA Personal Transfer Data 2006-2014. | GAO-16-60

Note: In GAO-16-60, we discuss the accuracy of BEA's personal transfer estimates.

BEA's estimates of remittances from the United States are based on demographic and household survey data and a model that calculates the remittance rates by demographic group. BEA assumes that the foreign-born population represents the relevant population of remittance senders in the United States, because this population is most likely to have a personal link to foreign residents. The estimates of personal transfers include all current transfers from resident to nonresident households, regardless of the means of transfer.

## BEA Changed Its Remittance Estimation Methodology in 2012 to Incorporate New Data on Reported Remittances

BEA changed its model for estimating remittances in 2012 by using new demographic variables and data on reported remittances from the August 2008 migration supplement to the Current Population Survey (CPS) conducted by Census.[32] For its revised model, BEA employed a multiplicative model—that is, a model whose results are the product of the combined effects produced by the individual variables. It used a nonstandard iterative technique to estimate the remittance rates.[33] These rates show the proportion of income that is remitted. To obtain total remittances, the remittance rates for different demographic categories can be multiplied by the number of individuals in those categories and their incomes. In its new methodology, BEA combined the new remittance rates from its revised model with ACS data on foreign-born residents and their income to estimate total remittances sent annually from the United States (see fig. 4).

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[32]The CPS is sponsored jointly by Census and the U.S. Bureau of Labor Statistics. It is a primary source of labor force statistics for the population of the United States. In August 2008, Census sponsored a supplement to the monthly CPS questionnaire. The CPS Migration Supplement contained a section on monetary transfers to collect data about the frequency and amount of money sent and received by households in the United States to and from friends and relatives living outside the United States.

[33]A multiplicative model used by BEA expressed the remittance rates as a function of the product of various variables that BEA expected to have an effect on the remittance rate. In standard regression models, the remittance rate would have been expressed instead as a sum of these variables. Also instead of estimating the model using standard regression techniques, BEA adopted an iterative approach, which estimated the effect of one set of variables while assuming others to be held fixed at 1. In the second and third round, the effect of another set of variables was estimated using the results of the prior rounds fixed, and so on until all the estimates converged and stopped changing.

**Figure 4: Basic Inputs to BEA's Current Remittance Estimation Model, as of 2012**
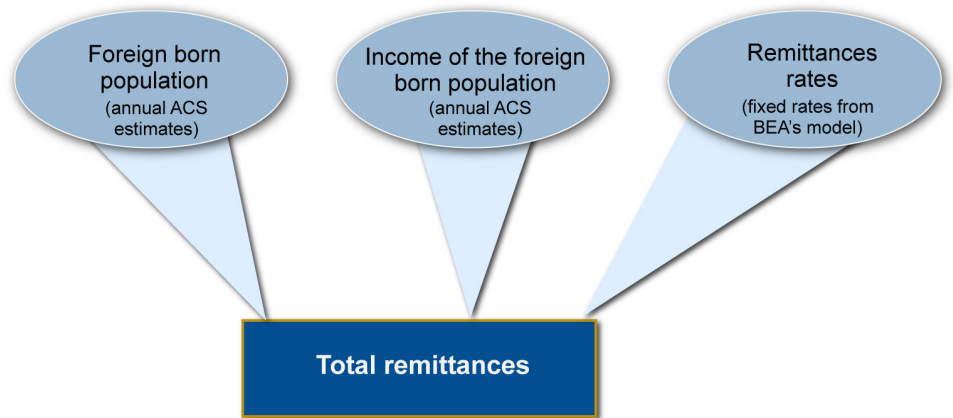


**Legend**
ACS - American Community Survey
BEA - Bureau of Economic Analysis
Source: GAO analysis.  |  GAO-16-60

The availability of nationally representative data on remittances in the CPS with actual reported numbers on remittances provided BEA with an opportunity to revise the model it created in 2005.[34] BEA first tested its previous demographic variables against CPS data and found that its assumptions about family structure and time in the United States were weak indicators of how much people reported to remit in CPS data and

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[34]The previous model combined detailed data on immigrants from the ACS with remittance rates by demographic category to estimate total remittances. The demographic characteristics included the country of origin, the duration of stay in the United States, and the presence of the immigrants' own children in the U.S. household.

that its previous country tiers did not match remitting behavior very well.[35] Therefore, in 2012 BEA changed the new model by,

- removing U.S. citizens born abroad of American parents, assuming that this group's remittance behavior would be similar to the behavior of U.S. born who were not included in their study;
- replacing the "children/no children" category with "married, spouse absent/other marital," because those in the latter category were more likely to send remittances to spouses abroad and were thus a better predictor of remittances;
- adding the category "living with roommates/other living arrangements," assuming that people shared housing to save money and therefore could send more remittances;
- combining immigrants who had been in the United States for 16 to 30 years with those who had been in the country for longer than 30 years into one category, "15 plus years," as they found in CPS data that these two categories had similar remittance rates; and
- reallocating countries within pre-existing geographical tiers as BEA found that their previous country allocations were not the best match for the CPS data.[36]

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[35]The country tiers in BEA's previous model were based on wealth and distance from the Unites States. The low tier was comprised of wealthy countries like Canada, Germany, and the United Kingdom. The middle tier consisted of middle-income countries like Argentina, Poland, and Thailand. The highest tier consisted of low-income countries throughout the world, including Latin American countries like Haiti, Honduras, and Mexico. The new geographical tier allocation is based on three immigration rules: whether the country a) is oversubscribed for applications for legal permanent residence, b) has temporary protected status, and c) has a visa waiver program with the United States and one "birth country characteristic" based on the World Bank's scores for government effectiveness and regulatory quality.

[36]Rachel Soloveichik and Anne Flatness, "Modeling Personal Transfers from the United States" (paper prepared for the 32nd General Conference of the International Association for Research in Income and Wealth [IARIW], Boston, MA, August 2012). The IARIW conference is an international forum for research on the measurement of income and related problems of statistical methodology. BEA staff also presented their work at a large Federal Committee on Statistical Methodology (FCSM) conference. FCSM is an interagency committee dedicated to improving the quality of federal statistics.

## BEA's Methodology Resulted in Unreliable Estimates, Partly Due to its Failure to Follow Best Practices and Guidelines for Federal Statistical Agencies

We found several issues with BEA's methodology that resulted in unreliable remittance estimates. BEA also did not follow its own best practices and Office of Management and Budget (OMB) or NRC guidance on documentation and methods for analysis that could have ensured reliability of its methodology and limited the inaccuracy in its estimates.

### BEA Did Not Follow Its Own Best Practices for Documenting Its Procedures

Despite OMB and agency guidance and best practices that would provide that BEA should document its procedures for developing its new model for estimating remittances, BEA did not prepare adequate, transparent documentation of its efforts to develop its new model. BEA also did not prepare adequate documentation of management review and approval of the new model.

OMB's Information Quality Act (IQA) guidelines, which are designed so that agencies will meet basic information quality standards, state that agencies should ensure that data and methods are documented and transparent enough to allow an independent reanalysis by a qualified member of the public.[37] IQA guidelines also direct agencies to develop management procedures for reviewing and substantiating the quality of information before it is disseminated. According to BEA best practice

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[37] The Information Quality Act (IQA) is the commonly used name for Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001. Pub. L. No. 106-554, tit. V, § 515, 114 Stat. 2763, 2763A-153 (2000) (codified at 44 U.S.C. § 3516 note). IQA requires OMB to provide guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by federal agencies. In accordance with the act, OMB developed policy and procedural guidance to federal agencies. 67 Fed. Reg. 8452 (Feb. 22, 2002). Under OMB's IQA guidelines, information deemed to be influential is to be held to a higher standard of quality; specifically, if an agency is responsible for disseminating influential scientific, financial, or statistical information, agency guidelines shall include a high degree of transparency about data and methods to facilitate the reproducibility of such information by qualified third parties. OMB defines influential, as used in the phrase influential scientific, financial, or statistical information, as meaning that the agency can reasonably determine that dissemination of the information will have or does have a clear and substantial impact on important public policies or important private sector decisions.

guidance, all changes in either methodology or data sources should receive documented management approval.[38]

In its own internal guidelines, BEA notes that it strives for the highest level of transparency about data and methods for its estimates to support the development of high-quality data and facilitate efforts to reproduce the information. Additionally, BEA best practices guidelines are designed to ensure the accuracy of input data; provide high-quality, timely analyses that document how estimates are made; and provide estimates that satisfy both internal and external customer needs. One BEA best practice is to enhance both transparency and replicability by instructing BEA staff to document each step or change in the methodology and document the rationale behind each decision.[39] Another BEA best practice states that written analyses of the estimate should include a discussion of changes and revisions as well as deviations from standard methods. However, based on our analysis, BEA did not follow these guidelines, as the following examples illustrate.

- Documentation showing how the final remittance estimate is calculated was not maintained. When asked to provide records of analysis that supported the calculations of 2012 and 2013 remittance estimates (the most recent estimates available at the time of our review), BEA staff told us that the documents were created only when each year's estimate was produced and were not saved. Unable to produce its original documents, BEA recreated the documentation to fulfill our request. However, BEA staff told us that the file could be missing some information required to successfully run the computer program that calculates total remittance estimates; for example, certain variables had been renamed and some fields were missing; their numbers were also multiplied by an arbitrary discount factor

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[38]Bureau of Economic Analysis, internal document, "Best Practices for Approving and Incorporating Changes in Methodology or in Data Sources."

[39]The best practice is included in the BEA internal document, "Best Practices for Approving and Incorporating Changes in Methodology or in Data Sources," which presents 10 practices BEA staff should follow. The practices are: justify the change, explain and document the change, provide experimental estimates, check for reasonableness, assess the resources required to implement the change, assess the impact on table designs and suppression, identify the time period the change could and/or should cover, notify and/or consult with those, both inside and outside of BEA, who use or provide the data, obtain higher level approval, and follow best practices guidelines for implementation.

whose use was explained to us only later as something done to avoid a break in the series.[40]

- Changes and revisions were not sufficiently documented. When asked to provide documentation of the analyses completed to determine changes in the model, BEA provided a conference paper containing written descriptions of its regression analyses.[41] BEA staff who completed these analyses told us that the regression files had not been saved in a way that would allow the staff to easily provide us with the files applicable to the model changes. The staff described saving them among many partially complete files and told us that it would be difficult to identify the files that led to the current version of the model. Unable to provide its original research, BEA attempted to recreate the steps that were used to create the model.[42]

- Management review of estimation methodology was insufficiently documented. BEA officials noted that staff adhered to internal guidance by obtaining both managerial and external reviews of the model's revision but provided little documentation of them. BEA staff said the remittance model proposal was presented to the Modernization and Enhancement Steering Committee (MESC) for formal review.[43] BEA provided minutes of the MESC meeting discussing the review of the model, but the minutes also indicated that BEA management was still considering changes. BEA staff could not provide documentation of additional management actions taken or of another MESC meeting held at a later date. BEA staff told us that the agency subjected the output of research that affected methodology changes to a full gamut of validity checks. However, the only documentation we received of a validity test was the MESC meeting minutes that contained a discussion of the model's assumptions. BEA

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[40]BEA told us that in 2011 or 2012 they had a slight change in their "logic" that caused the series to increase by 2 percent. BEA wanted to avoid a break in the series and did not want to revise previous years, so BEA put in this number as an adjustment factor.

[41]The descriptions were contained in the appendix of a research paper BEA used at professional conferences to describe the changes made to the model. Soloveichik and Flatness, "Modeling Personal Transfers."

[42]BEA staff noted that some of the recreated regressions produced results that differed slightly from the results reported in the conference paper. BEA staff explained that the difference might be due to typographical errors in the conference paper or to differences in the original and recreated regressions.

[43]The MESC is made up of selected senior members of the division responsible for estimating remittances, the Balance of Payments Division, including its chief, who offers feedback to guide and refine the staff's work.

staff told us that the personal transfers model had been subjected to additional scrutiny by BEA senior management resulting from the authors' conference presentations.[44] However, BEA did not provide us with either documentation of the conference feedback or the results of senior management's additional scrutiny. BEA officials stated that the decision to publish a Survey of Current Business article about the model's revision constituted verification of management review.[45] However, BEA could not provide any documentation of the approval process for publication to demonstrate what the management review entailed.

- The rationale and appropriateness of its methodology for estimating remittances was not documented. According to NRC guidelines for federal statistical agencies data releases from a statistical program should be accompanied by assumptions used for data collection, and what is known about the quality and relevance of the data.[46] The guidelines also mention appropriate methods for analysis that take account of variability and other sources of error and the results of research on the methods and data. We found BEA did not follow these guidelines, as illustrated by the following examples,

- Data. We were unable to verify the accuracy of the data because we were not provided with documents detailing the steps and analyses BEA undertook to convert CPS data to the dataset BEA actually used to estimate the model. A BEA best practice states that an analysis of the estimate should include a discussion of questionable aspects of the source data, including outliers.[47] However, BEA could not provide us with documents showing analyses performed to deal with various

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[44]Soloveichik and Flatness, "Modeling Personal Transfers."

[45]BEA officials said that the review process culminated with a briefing to BEA's executive staff but did not provide us with documentation of the review. Articles in the *Survey* present BEA's latest national, international, regional, and industry estimates; describe the methodologies used to prepare the estimates; provide information about major revisions; discuss ongoing innovations; and generally keep users up to date on relevant BEA issues and initiatives.

[46]National Research Council, *Principles and Practices for a Federal Statistical Agency, 18.*

[47]BEA, internal document, "Best Practices Standards: BEA Data Handling and Documentation Standards." Outliers are extreme observations or observations that do not follow the pattern in the data and usually have an undue influence on the results in a regression model.

problematic aspects of the data and treatment of outliers.[48] In addition, BEA conducts an analysis to assign a portion of the household's income to each individual in the household. The income amount attributed to each individual is a critical component of the model and has a substantial effect on the result, yet BEA could not provide any documents showing sensitivity analyses of this critical assumption to see how the attribution of income affects its results.[49] Further, for some households that did not have any family income in CPS data, BEA assigned them incomes but could not tell us how they calculated them. BEA also assigned all households within a given range of family income the same income.[50] This approach introduces measurement error to the extent that households within a given range of family income do not, in fact, have the same income. BEA could not provide any documentation explaining these details or what implications the assigned incomes could have on its results.

- Estimation Technique. As described earlier, BEA used a nonstandard iterative technique to estimate its model. BEA staff acknowledged that the method was unusual and may be hard to comprehend. When we requested additional information on management review of the model, BEA staff stated that they had had the model reviewed by an outside

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[48]BEA mentions in its paper that most of the households remit little or nothing while a few households give very large amounts and account for a significant fraction of total remittances. BEA staff stated that mean remittances drop by 60 percent if 175 households (out of more than 6,000) that remit $5000 or more are excluded. We do not know if and how BEA dealt with this issue. Moreover, we found that there were 51 households that were reported to have sent a remittance of $27,199. BEA staff told us that this was because the CPS top-codes the remittance variable so that any remittance value above $10,000 is coded as $27,199 as this is the mean of all remittances above $10,000. These instances, which are outliers in the data, significantly influence the resulting remittance rates but BEA could not provide documentation to show how influential these outliers actually are.

[49]BEA estimates remittances by using individual-level data from the ACS, but its estimation model is based on household data on remittances from the CPS. This poses a problem because CPS data reports remittances for the household as a whole and individual demographic characteristics as reported in the ACS can vary among individuals comprising a household.

[50]For example, in CPS data, *family income* is only reported as being within a range (e.g., $40,000 to $49,999). BEA assigns to all households with family income in the $40,000 to $49,999 range, the same family income of $45,000.

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expert. However, officials later said the review was informal and no written opinion was provided.[51]

- Model specification. BEA did not follow IMF's guide for compilers in two instances related to issues of model specification.[52] First, the guide specifies that the variables used to explain and predict remittance rates may need to be converted to different forms to see if they generate a better model.[53] BEA could provide no documentation showing it attempted to do this analysis. Second, the IMF guide states that statistical analyses are also needed to understand the relationship of different demographic variables to each other and to remittance rates in order to select the relevant variables. BEA could not provide us with any documentation showing they performed any tests on the relationship among different demographic variables.

- Goodness-of-fit. This term refers to how well a model represents the data.[54] The IMF guide states that various statistics describing goodness-of-fit should be calculated to decide on the best model for determining the level of remittances. BEA presented the results of

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[51]BEA staff also told us that for the work on remittances, a top BEA economist provided direct supervisory suggestions on modeling and econometric approaches. Staff added that the work was subject to normal examination by the reviewers in the supervisory chain. However, BEA could not provide documentation of reviews in the supervisory chain, other than the MESC meeting minutes, in response to our request. Staff added that because the results were presented in two research forums, both the results and the underlying estimation approach and programming were scrutinized by other interested researchers. The extent of any peer review the paper received at the conferences is unclear because the audience feedback was not documented.

[52]As mentioned earlier, the guide for compilers provides recommendations designed to improve the quality of remittance data.

[53]International Monetary Fund, *International transactions in remittances: guide for compilers and users.* This publication provides guidelines for countries to improve the quality of remittance statistics by using suitable methodologies based on data availability and national circumstances. Variables can be converted in different forms such as quadratic or logarithmic to see if that better describes the relationship between dependent and independent variables.

[54]Goodness-of-fit indicators also allow for comparison between models as they give an indication of which model is better at representing the data.

only one such test, namely the "R-squared (R2)."[55] Moreover, BEA does not report standard errors for their models' coefficients using their iterative method and does not document that this iterative method would produce correct standard errors for these coefficients.[56]

## BEA's Methodology Resulted in Unreliable Estimates

We identified several errors in BEA's analysis that led us to question the reliability of BEA's estimates. Moreover, BEA adjusted the new model to match results from its prior model, contributing to inaccuracy in its estimates. We found the following problems with BEA's methodology.

- Presence of outliers in the data had a substantial influence on the model's results. There are 6,136 households in BEA's data. In its data, the CPS reported that 51 households (0.9 percent of all households) remitted $27,199. The CPS averages remittances across all households that remit more than $10,000 annually and assigns the average (in this case, $27,199) to each of these households. BEA includes these 51 households in its data, all of which are assumed by BEA to remit $27,199 even though they differ in income levels. These households are outliers in BEA's data, since all other households included remit between $0 and $10,000. These outliers are highly influential, as excluding them significantly changes the remittance rates that would have resulted using BEA's own methodology. For example, BEA calculates that a person who is married with a spouse absent, lives with roommates, has been in the United States for less than 5 years, and belongs to the highest country tier remits 73.1 percent of his or her income (see table 1).[57] If we remove the outliers from the data, this percentage changes to 14.9 percent. OMB's

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[55]The $R^2$ test is a measure of the how well the proposed model fits the data. $R^2$ is most commonly expressed as a percentage ranging from 0 to 100. A low $R^2$ suggests that the model is a poor fit, while a high $R^2$ indicates that the model very closely matches the data. BEA's model produced an $R^2$ of 6.75 percent. BEA mentions an $R^2$ of 7.93 percent in the paper. But, according to the notes in one of the files we received from BEA, the analyst mentions that the number reported in the paper is inaccurate due to miscoding of one of the variables and the correct number is 6.75 percent. In other instances, BEA has reported an $R^2$ of 15.8 percent. BEA got this number when it ran the model again for us using a different dependent variable.

[56]The standard error is an estimate of the standard deviation of the coefficient and can be thought of as a measure of the precision with which the regression coefficient is measured. The standard error of the estimate thus can be thought of as a measure of the accuracy of predictions.

[57]Immigrants from a group of countries that remit the most compared to other immigrants are said to belong to the highest country tier.

Statistical Policy Directive No. 1 states that where appropriate any known or potential data limitations or sources of error should be described to data users so they can evaluate the suitability of the data for a particular purpose.[58] But BEA does not mention this aspect of the data in its publication even though it has significant influence on the results.

**Table 1: Remittance Rates from Bureau of Economic Analysis's Model, with and without Outliers**

| Country tier | Family structure | With outliers[a] | | | Without outliers[b] | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | 0 to 5 years | 6 to 15 years | 15 plus years | 0 to 5 years | 6 to 15 years | 15 plus years |
| Low | Other marital, no roommates | 1.1% | 0.8% | 0.5% | 0.4% | 0.3% | 0.2% |
| Low | Other marital, with roommates | 3.9 | 2.9 | 1.6 | 0.8 | 0.7 | 0.3 |
| Low | MSA, no roommates | 5.9 | 4.5 | 2.4 | 1.6 | 1.4 | 0.7 |
| Low | MSA, with roommates | 11.2 | 8.5 | 4.6 | 1.4 | 1.2 | 0.6 |
| Middle | Other marital, no roommates | 1.1 | 0.8 | 0.5 | 1.2 | 1.0 | 0.5 |
| Middle | Other marital, with roommates | 3.9 | 2.9 | 1.6 | 2.5 | 2.2 | 1.0 |
| Middle | MSA, no roommates | 5.9 | 4.5 | 2.4 | 5.0 | 4.3 | 2.1 |
| Middle | MSA, with roommates | 11.1 | 8.5 | 4.6 | 4.3 | 3.7 | 1.8 |
| High | Other marital, no roommates | 2.8 | 2.1 | 1.1 | 2.0 | 1.7 | 0.8 |
| High | Other marital, with roommates | 9.7 | 7.3 | 4.0 | 4.1 | 3.5 | 1.7 |
| High | MSA, no roommates | 14.8 | 11.2 | 6.1 | 8.2 | 7.0 | 3.4 |
| High | MSA, with roommates | 28.0 | 21.2 | 11.5 | 7.0 | 6.0 | 2.9 |
| Highest | Other marital, no roommates | 7.2 | 5.5 | 3.0 | 4.2 | 3.6 | 1.7 |
| Highest | Other marital, with roommates | 25.4 | 19.2 | 10.4 | 8.8 | 7.5 | 3.6 |
| Highest | MSA, no roommates | 38.6 | 29.3 | 15.9 | 17.5 | 14.9 | 7.2 |
| Highest | MSA, with roommates | 73.1 | 55.5 | 30.1 | 14.9 | 12.7 | 6.1 |

Legend: MSA = married, spouse absent.

Source: BEA and GAO calculations | GAO-16-60

Notes: Outliers consist of those remitting over $10,000 but being assigned a value of $27,199. Out of 6,136 households, 51 outliers were removed for this comparison.

[a]Rates provided by BEA.

[b]GAO calculation using BEA methodology after removing the outliers from the dataset.

- BEA's model was not consistent with the data. BEA's model assumption that all individuals within a demographic category remit on

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[58]Statistical Policy Directive No. 1: Fundamental Responsibilities of Federal Statistical Agencies and Recognized Statistical Units, 79 Fed. Reg. 71,610 (Dec. 2, 2014).

average the same percentage of their income is inconsistent with its data, which show that 75 percent of households remit nothing at all. Moreover, BEA's model generates remittance rates for certain categories of households that have no individuals in them. For example, the model calculates that individuals in households with married persons with absent spouses who have roommates, who remit to low-tier countries, and who have spent 6 to 15 years in the United States, remit 8.5 percent of their income. However, there are no such individuals in the data.[59] BEA failed to point out these data deficiencies even though OMB's Statistical Policy Directive No.4 asks agencies to clearly point out limitations of the data to users.[60]

- Failure to account for censored data leads to biased results. Because the value of reported remittances is only partially known, BEA's remittance data are censored data. The remittance data are censored (at the bottom) because 75 percent of households remit $0 and all other households remit positive sums. The remittance data are censored (at the top) because, as noted earlier, the CPS assigns all households that remit over $10,000 a remittance value of $27,199. Estimating a model on censored data demands certain econometric techniques, which BEA has not adopted, in order to yield unbiased estimates.[61] The guidelines presented by NRC as mentioned above specifically ask agencies to use appropriate methods for analysis that take account of variability and other sources of error.[62]

- BEA's model is incorrectly specified in its documentation, and the actual model specification may lead to biases. BEA's documentation states that its model explains the total amount remitted by a household (in part) in terms of that household's income level. However, BEA's model assumes that the total amount remitted by a

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[59]Similarly, BEA reports that individuals in households with 'MSA & Has roommates,' who remit to low-tier countries, and who have spent over 15 years in the United States remit 4.6 percent of their income. However, there are no such individuals in the BEA data. In fact, 25 percent of categories in which BEA classifies individuals are populated by five or fewer individuals. Hence, 25 percent of the estimated remittance rates as a fraction of income that BEA reports are based upon very little to no data on the individuals who are attributed these remittance rates by BEA.

[60]Statistical Policy Directive No. 4: Release and Dissemination of Statistical Products Produced by Federal Statistical Agencies, 73 Fed. Reg. 12,622 (Mar. 7, 2008).

[61]BEA estimates its model using a series of Ordinary Least Squares (OLS) regressions. When the dependent variable (remittances in BEA's model) is limited in some way, OLS estimates are biased.

[62]National Research Council, *Principles and Practices for a Federal Statistical Agency, 18.*

household depends only on the income of the foreign-born individuals in the household.[63] To the extent that U.S.-born individuals in a household do remit, BEA's model overestimates the fraction of income remitted by foreign-born individuals in that household. BEA officials said that they excluded U.S.-born individuals from a household on the basis that they remitted very little. But we found that 407 households with only U.S.-born individuals reported remitting almost 13 percent of total remittances, suggesting that the remittance rates of foreign-born individuals may be overestimated and, thus, biased.

- Measurement errors in a critical explanatory variable bias the results. As explained earlier, BEA's assignment of household income to individuals within the household is critical to its analysis. Since this individual income variable is subject to measurement error, it biases the effect of this variable on the remittance rates, contributing to the unreliability of the remittance estimates calculated by BEA.

- Several coding and other errors also contributed to inaccuracy. BEA staff said that they considered the estimation of the personal transfers model a relatively straightforward task.[64] As such, they did not consider independent programming of code by a reviewer necessary. We found several errors and unexplained adjustments in BEA's code that might have been detected had a review been conducted.

- Calibration of this new model to match unreliable old estimates enhanced unreliability. BEA's model predicts total remittance amounts that are substantially lower than those BEA has historically published. BEA handles this difference by multiplying the remittance rates from its model by an arbitrary calibration factor so that the total model's estimated remittances equal those that BEA previously calculated for 2008.[65] BEA calibrated the model because an analysis of CPS data determined that remittance rates may have been underestimated because many immigrants were reluctant to report their precise

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[63]In households that include both U.S.-born and foreign-born individuals, 50 percent of individuals in a household are U.S.-born, on average, and they account for 46 percent of the household's income on average.

[64]BEA officials told us that the extent to which various operating procedures are used depends on the procedure in question, the complexity and importance of the model or estimates, and the expertise of the staff assigned to their preparation.

[65]The number BEA uses is 2.76.

remittances.[66] Because BEA calibrated the new model to old estimates, BEA estimated the same remittance amount for the year 2008 that the old model had produced. For the years following 2008, the remittance estimates differed slightly from the previous estimates because of the different demographic characteristics used in the new model (see table 2).

In our March 2006 report on BEA remittance estimates, we questioned the accuracy of BEA estimates based on the model developed in 2005 after finding that the remittance rates BEA used were primarily based on its own judgment.[67] We found shortcomings in BEA's model, specifically with regard to the assumptions BEA made about the percentage of income remitted and the percentage of foreign-born persons who remit. We were unable to link the parameters that BEA used to capture the remitting behavior of foreign-born persons directly to the sources that BEA cited. We found that BEA used its own judgment to determine the proportion of the adult foreign-born population that sent remittances and the proportion of income they remitted. We concluded that the accuracy of these estimates was affected both by the quality of the underlying data as well as by these assumptions. Therefore, calibration of the new model—which may itself be unreliable—to the old estimates further affects the reliability of the final estimates.

**Table 2: Comparison of Estimates from BEA's Old and New Methodologies**

Dollars in billions

| | Total annual remittances | |
| --- | --- | --- |
| | Old methodology | New methodology |
| 2001 | $26.5 | $27.1 |
| 2002 | 27.7 | 27.4 |
| 2003 | 28.0 | 27.5 |
| 2004 | 30.4 | 30.1 |
| 2005 | 31.3 | 30.9 |
| 2006 | 34.3 | 35.3 |
| 2007 | 36.9 | 37.1 |

[66]G. Patricia de la Cruz, Luke J. Larsen, and Elizabeth M. Grieco, *An Overview of the August 2008 CPS Migration Supplement*, Working Paper No. 95, U.S. Census Bureau, May 2012.

[67]GAO-06-210.

| Dollars in billions | | |
| --- | --- | --- |
| | Total annual remittances | |
| | Old methodology | New methodology |
| 2008 | 38.5 | 38.5 |
| 2009 | 37.4 | 36.1 |
| 2010 | 37.1 | 35.6 |

Source: GAO analysis of BEA data. | GAO-16-60

## BEA Does Not Regard Its Remittance Estimate as Influential

BEA officials told us that the personal transfers estimate was not a principal economic indicator. Therefore, BEA considered information related to the development of the estimate to be influential (as defined by OMB's IQA guidelines) only in terms of the integrity of the estimate's dissemination.[68] Nonetheless, BEA's Information Quality Guidelines state that at BEA the notion of data integrity goes beyond the maintaining of the security of its information. Integrity includes, among other things, transparency that is ensured by providing certain information, such as assumptions for missing source data and discussions of revisions.[69] BEA officials also noted that personal remittances were a relatively small component of the U.S. current account.[70] According to BEA officials, over the past 5 years personal transfers accounted for an average of 0.59 percent of gross current account transactions. Officials said that, as a result, resources devoted to improving the estimation of personal remittances had to be balanced with resources allocated to improving other estimates that could be more important to the balance of payments. However, a number of organizations use BEA's estimates. BEA reports its personal transfer estimates to IMF, which publishes country estimates in its Balance of Payments Statistics Yearbook. In addition, the World

[68]As mentioned previously, OMB's IQA guidelines define "influential" as meaning that an agency can reasonably determine that dissemination of the information will have or does have a clear and substantial impact on important public policies or important private sector decisions. 67 Fed. Reg. 8452, 8460. According to the guidelines, ''integrity'' refers to the security of information—the protection of the information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification. 67 Fed. Reg. at 8460.

[69]U.S. Bureau of Economic Analysis, *Information Quality Guidelines* (Washington, D.C.: Updated September 2014), accessed July 6, 2015, http://www.bea.gov/about/infoqual.htm.

[70]The current account consists of transactions between U.S. residents and nonresidents in goods, services, primary income, and secondary income (including personal remittances).

Bank uses BEA estimates submitted to IMF as part of its calculations on remittances. IDB's Multilateral Investment Fund also uses estimates published by IMF as a baseline for its calculations of individual country estimates.

BEA officials also noted that OMB's guidelines give agencies discretion in determining the level of quality to which information will be held.[71] However, while the guidelines do afford agencies some discretion, the guidelines make it clear that agencies should not disseminate substantive information that does not meet a basic level of quality.[72] As discussed earlier, by failing to follow its best practices, BEA has not met this basic quality level. BEA officials did not explain the reasons behind not following their own best practices or failing to maintain adequate documentation along the way. We have previously stated that appropriate documentation of a significant event or internal control, in a manner that allows it to be readily available for examination, is an example of a control activity that can be taken by federal program management.[73] This type of control activity allows management to achieve objectives and respond to risks in its internal control system. Such events would include supervisory review of methodological changes to BEA's estimation model.

Moreover, BEA's best practices require documentation of its methodology and data and supervisory and management review and approval of any changes. But BEA has not provided sufficient and transparent documentation of its procedures for developing its new personal remittance estimation model. The lack of documentation made our evaluation of BEA's model and estimates difficult, and it was not possible for us to obtain reasonable assurance that BEA met federal guidelines

[71]OMB guidelines allow agencies to weigh the costs (for example, costs attributable to agency processing efforts, respondent burden, maintenance of needed privacy, and assurances of suitable confidentiality) and the benefits of higher information quality in the development of information, and the level of quality to which the information disseminated will be held.

[72]OMB guidelines state that it designed the guidelines so that agencies will meet basic information quality standards. OMB adds that agencies shall adopt a basic standard of quality (including objectivity, utility, and integrity) as a performance goal and should take appropriate steps to incorporate information quality criteria into agency information dissemination practices.

[73]GAO, *Standards for Internal Control in the Federal Government*, GAO/AIMD-00-21.3.1 (Washington, D.C.: November 1999).

and its own internal standards. Because the documentation provided to us by BEA is lacking in both clarity and completeness, we cannot say that BEA has met the goal of IQA to ensure and maximize the quality, objectivity, utility, and integrity of its remittance statistics, which are public information disseminated by federal agencies. However, based on the information we were able to obtain, we were still able to determine that the model produces unreliable annual estimates.

## Conclusions

BEA's updated model for estimating remittances produces unreliable results due to underlying issues with the data, such as missing information and measurement problems. BEA did not satisfactorily explain why its methodology was appropriate, despite NRC's guidance to do so. Moreover, BEA calibrated the new estimates to align with those from its old model, the accuracy of which we had previously called into question. Additionally, BEA could not provide us with sufficient documentation of the steps it took to test the model and ensure it received management review and approval—key quality assurance procedures.

Documentation of BEA's processes of analyzing, testing, and reviewing its model should not be simply an act of memorializing events. Documentation also provides evidence of an agency's adherence to procedures and policies that are part of its quality assurance framework. BEA's methodology for estimating remittances is not consistent with guidelines prescribed by BEA's best practices standards, the standards of IQA, OMB statistical directives, and NRC guidance. Had BEA subjected its model to these standards, it would have taken important steps toward obtaining reasonable assurance that it had produced reliable annual estimates of remittances.

Although BEA officials discount the importance of remittances as a component of international transactions statistics, the inability of BEA's new model to produce more accurate remittances estimates is consequential, as BEA's estimate is the official remittance estimate of the United States and is cited by both national and international organizations, and in some cases incorporated into the estimates of these organizations.

# Recommendations for Executive Action

We recommend that the Secretary of Commerce direct the BEA Director to take the following actions:

To improve the reliability of the annual official U.S. estimate of remittances, conduct additional analyses of BEA's estimates using estimation techniques appropriate for dealing with the shortcomings of the data. Analyses should also be conducted to understand the effect of various assumptions behind and limitations of the data on the estimates.

To improve the transparency and quality of BEA's international remittances estimate, follow established BEA best practices, OMB policies, and NRC guidance for documenting BEA's methods and analyses used to revise its model for estimating remittances and for producing its annual estimates.

# Agency Comments and Our Evaluation

We provided a draft of this report to the Secretaries of Commerce, Homeland Security, State and the Treasury, the Chair of the Board of Governors of the Federal Reserve System, and the Director of Consumer Financial Protection Bureau (CFPB). Commerce provided a letter, including written comments the Bureau of Economic Analysis (BEA) on a draft of the report, which are reprinted in Appendix II. CFPB, Treasury and State provided technical comments, which we incorporated as appropriate.

In its comment letter, BEA stated that it intends to implement our two recommendations to the extent possible consistent with resource limitations as it continuously improves its remittance (personal transfer) estimate and other estimates. However, BEA stated that it did not agree with our report's conclusions that its remittance estimates are unreliable or that its documentation of changes to its estimation model or annual estimates is inadequate. More specifically, BEA commented that it believes that its remittance estimates are valid and reasonable for the purpose for which they are prepared and that the documentation provided to GAO was fully adequate. We recognize BEA's resource constraints. However, we maintain that our findings related to the reliability of BEA's remittance estimates and documentation of the methodology to produce such estimates are valid and support the recommendations we made in the report.

Regarding our conclusion that BEA's remittance estimates are unreliable, in its comment letter BEA acknowledged the data limitations that GAO pointed out in the report but did not explain how these may affect its

estimates. The limitations described in BEA's comment letter were not discussed in the documentation provided by BEA. Nor did BEA provide evidence showing that it conducted alternative analyses to conclude that these limitations did not affect the quality of its final estimates. For example, in its comment letter BEA mentions that the calculation of its income variable was problematic but during our review did not present us with analysis to show how sensitive its estimates were to various assumptions about income, including that of taking the midpoint of the range of income provided in its data. Even BEA's choice of demographic variables included in their analysis depends on how it calculates individual income. BEA acknowledges that its data was censored—where the value of reported remittances for some households in its data set is only partially known—but during our review, it did not provide evidence that it conducted additional analyses using an alternative methodology to see how final estimates might be affected. BEA told us that these households were responsible for a substantial proportion of all remittances and we found that it had considerable influence on BEA's estimates. Though these and other data limitations described in this report could have substantial impact on the estimates, in its comments BEA dismisses the limitations stating that they would only have marginal effect on the estimates. However, BEA does not present evidence of having tested the magnitude of the effects on the estimates. Moreover, calibrating the estimates resulting from BEA's revised estimation model to its previous estimates, the accuracy of which was deemed uncertain in a previous GAO report, further undermines our confidence in these estimates. As a result of data limitations, BEA's choice of methodology in light of those limitations, and other errors and corrections BEA made, we maintain that BEA's revised estimation model produces unreliable remittance estimates.

Regarding our conclusion that BEA did not follow the best practices, policies, and guidance to which it is subject for documenting its methods and analyses, BEA stated that the documentation provided to GAO was fully adequate. We disagree. As discussed in this report, we identified several instances where BEA did not follow best practices, policies, and guidance. For example, we requested files that provided documentation of the analyses BEA conducted to determine changes to its estimation methodology. BEA provided written descriptions of its regression analysis in a conference paper. BEA staff told us that its analysis files had been saved among many partially complete files and that it would be difficult to identify the files that led to the current version of the model. BEA's best practice standards require that all methodological changes and the rationale for the changes be clearly documented. As we describe in the

report, without documentation BEA could not effectively convey and support the rationale and appropriateness of its methodology. We were unable to verify, among other things, the accuracy of much of BEA's data or fully understand the selection of its methodology.

As we stated in the report, documentation of analysis, testing, and evaluations of models should show evidence of adherence to procedures and policies that are part of an effective quality assurance framework. BEA did not provide documentation that reflected such a framework. For example, BEA officials described conducting managerial and external reviews of the model's revision but provided only the minutes to one management review meeting indicating that the model had been discussed but was still under consideration. Though we requested documentation of final approval of the model by the management committee, BEA told us that it had nothing further to provide. BEA also described an external review of its model revision that was done by an external econometrician for quality assurance purposes. When we asked for documentation of this review, however, BEA told us that it had been informal and that no written opinion had been provided.

In addition, BEA stated that our ability to reproduce the agency's estimates showed that its documentation was adequate. However, we did not attempt to reproduce BEA's estimates. Rather, we ran the computer program that BEA provided on the data created by BEA to replicate a few intermediate steps in its methodology. By replicating these steps, we found inconsistencies between BEA's description of the analysis and what was actually done, and other errors. We did not and would not have been able to reproduce the analysis, based on the documentation that BEA provided, that led to the final remittance estimates or even create the dataset used by BEA from its listed sources.

BEA noted that it provided us with new summaries to help explain certain aspects of its methodology, but asserted that we conflated this additional effort with an inadequacy of internal control and initial documentation. However, we maintain that in some cases, BEA provided these summaries because it was unable to provide us with original documentation. For example, we asked for records of analysis that supported the calculations of 2012 and 2013 estimates. BEA told us that the documents were created only when each year's estimate was produced and were not saved. BEA also was unable to provide original documentation of the analysis that led to the current version of the model and attempted to recreate its steps in new documentation.

BEA also rejected the statement that it did not follow best practices because it did not consider remittances to be influential. During our review, BEA staff told us that information about BEA's remittance estimates was designated as influential only to prevent their disclosure before they were officially released. BEA also told us orally and in writing that as personal remittances were a relatively small component of the U.S. current account, resources devoted to improving the estimate of remittances had to be balanced with resources allocated to improving other estimates that could be more important to the balance of payments.

Finally, BEA stated its remittance estimate was not designed to measure the potential impact of the WIRE Act (proposed Remittance Status Verification Act of 2015), and it understood that we would use its estimates as a basis for understanding the magnitude of cross-border transfers. BEA's comment inaccurately described the purpose and scope of our review. As we describe in this report, our review focused on two separate objectives which were to (1) discuss the potential effects of assessing a fine on remitters unable to provide proof of legal U.S. immigration status, and (2) examine BEA's remittance estimate and the extent to which its revised estimation methodology met government-wide policies and agency best practices. We used information on BEA's remittance estimates solely to help us answer the report's second objective.

We are sending copies of this report to interested congressional committees and the Secretaries of Commerce, Homeland Security, State, and Treasury, as well as to CFPB and the Federal Reserve Board. In addition, the report will be available at no charge on GAO's website at http://www.gao.gov.

If you or your staffs have any questions about this report, please contact me at (202) 512-8678 or cackleya@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs are listed on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

Alicia Puente Cackley
Director, Financial Markets and
  Community Investment

# Appendix I: Objectives, Scope, and Methodology

This report (1) discusses the potential effects of collecting information from and imposing a fine on remitters unable to provide proof of legal U.S. immigration status, and (2) examines the Bureau of Economic Analysis' (BEA) remittance estimate and the extent to which the revised estimation methodology met government-wide policies and agency best practices.

To discuss the potential effects of assessing a fine on remitters unable to provide proof of U.S. immigration status, we summarized estimates of the number of immigrants without legal status from federal agencies and research organizations, including the Department of Homeland Security (DHS), Pew Research Center, and Center for Migration Studies (CMS). Together, DHS, Pew Research, and CMS are primary sources for the estimates of immigrants without legal status in the United States, which we determined by asking experts from each organization above to discuss all other similar estimates. Through interviews with immigration researchers, review of research articles, and comparison of the estimates, which ranged from 11.1 million to 11.4 million immigrants in the United States without legal status in 2012, we determined that the estimates were authoritative and sufficiently reliable for the purposes of this report. We used these sources to identify the size of the potentially affected group of immigrants without legal status.

To acquire information on the effects of the proposed requirement to provide proof of legal status or pay a fine, we reviewed relevant academic and industry studies based on a literature search. We reviewed and summarized the literature for factors that could be associated with the proposed legislation, including the number and remitting behavior of immigrants without legal status, changes in remittance flows in response to a price increase, the effect of requiring proof of legal status on remittances, and market competition between remittance providers.. We determined the studies to be reliable for our purposes.

To obtain perspectives on the potential effects of imposing a fine on remitters without proof of U.S. legal status, we interviewed researchers with expertise in remittances and immigration to the United States, financial institutions, remittance service providers, two industry trade associations, one state audit association, two community groups with knowledge of remitters' concerns, and knowledgeable federal and international agencies. We judgmentally selected a cross-section of remittance transfer providers that included five nondepository remittance transfer providers and four depository institutions based on a number of factors, including the volume of remittances and diversity of countries

serviced. We spoke with regulators, including the Consumer Financial
Protection Bureau (CFPB) and the Financial Crimes Enforcement
Network (FinCEN), to obtain their perspectives on compliance with
requirements of the proposed Remittance Status Verification Act of 2015,
should it become law. We also reviewed laws and regulations relevant to
remittance transfer providers. Researchers with expertise in remittance
transfers were selected by contacting two recognized experts and asking
for referrals. We interviewed the experts recommended and continued to
ask for others until the referrals began to repeat with experts we already
interviewed. To select community groups, we asked others we
interviewed for recommended groups.

To highlight the uncertainty associated with the effects of the fine, we
constructed a scenario analysis of several factors that may affect net
revenue from the fine, which is the amount of fine collected that remains
available for border protection after payment of CFPB's administrative
and enforcements costs. We varied hypothetical amounts for the following
three factors: dollar amount of remittances sent by immigrants without
legal status, the percentage reduction in remittances in response to the
fine, and the cost for administration and enforcement. We selected the
three factors by analyzing them among other potential factors and we
found that these three provided wide variability in net revenue from the
fine. Other factors we considered included the volume of total
remittances, the percentage transmitted through formal methods, and the
percent of remittances sent by immigrants without legal status. Though
we conducted a literature search for statistics for each factor in our
analysis, any studies found were not generalizable or sufficient for our
purposes. The data were limited to remittance flows between specific
countries, for example remittances sent between the United States and
Mexico, or were not recent. Therefore, the dollar amounts or percentages
given to each factor in our scenario analysis are hypothetical and
selected only to show the potential variability in net revenue from the fine.

To obtain information on BEA's estimate of remittances (personal
transfers) from the United States, we met several times with BEA officials
responsible for developing the estimate. They provided us with an
estimate of the total volume of remittances from the United States to the
rest of the world from 2006 to 2014 that they provided to the IMF for
inclusion in balance of payments statistics. In this report, we further
assess BEA's estimation model and find that its results are unreliable.

To understand BEA's revised methodology for estimating remittances
(personal transfers) we conducted multiple interviews with BEA staff

responsible for developing the estimate. We obtained BEA documentation describing the agency's approach to estimating remittances, including components of its model, related statistical program files, and its outputs. We reviewed BEA's presentation and description of the model and checked for consistency with its statistical program files and other calculations. We provided BEA with numerous follow-up questions about the methodology, and BEA provided us with written responses and attended additional meetings to provide more clarity. We also obtained documentation on the Census Bureau's (Census) American Community Survey and Current Population Survey data to understand how they were used in BEA's remittance estimation methodology and interviewed Census officials familiar with the survey. We also reviewed BEA's best practices, Office of Management and Budget (OMB) statistical directives, and the National Research Council (NRC) of the National Academies of Sciences' manual for statistical agencies to determine the extent to which BEA's methodological changes conformed with guidance on statistical practices.

To determine the extent to which BEA documented its changed methodology and its results and adhered to best practice standards, we met with BEA staff responsible for developing the estimate. BEA staff explained their documentation procedures to us. BEA staff also provided copies of BEA guidance on best practices regarding methodological changes. We also reviewed relevant law and regulations, as well as guidance from IMF, the Department of Commerce, OMB, and NRC. We reviewed documents provided by BEA for transparency and completeness. Additionally, we provided BEA with follow-up questions about the agency's documentation processes and procedures, and BEA provided us with written responses. After receiving the responses, we again met with BEA staff to discuss these processes and procedures.

To obtain a variety of views on remittance estimation, we met with officials from IMF, World Bank, Inter-American Development Bank and their external consultant, as well as the Mexican and Philippine central banks. We selected these two countries because they were among the top 10 recipient countries of U.S. annual outflows and both countries use a formal methodology to track inflows and outflows on at least an annual basis. In meetings with these entities, we gained an understanding of the methodologies used to estimate remittances and challenges in remittance estimation.

We conducted this performance audit from October 2014 to February 2016 in accordance with generally accepted government auditing

standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Appendix II: Comments from the Department of Commerce

THE DEPUTY SECRETARY OF COMMERCE
Washington, D.C. 20230

January 27, 2016

Ms. Alicia P. Cackley
Director
Financial Markets and Community Investment
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Cackley:

The U.S. Department of Commerce appreciates the opportunity to comment on the U.S. Government Accountability Office's draft report titled *International Remittances: Actions Needed to Address Unreliable Official U.S. Estimate* (GAO-16-60). The Department's comments on this report are enclosed.

Sincerely,

Bruce Andrews

Enclosure

U.S. Department of Commerce Comments on the
U.S. Government Accountability Office
Draft Report titled *International Remittances: Actions Needed to Address Unreliable Official U.S. Estimate*

(GAO-16-60)

January 2016

**Summary**
The Bureau of Economic Analysis (BEA) prepares official statistics for the U.S. national and international economic accounts that present essential information on key issues such as economic growth, regional economic development, interindustry relationships, and the Nation's position in the world economy. One set of statistics, the U.S. international transactions accounts, provides information on a variety of transactions between U.S. residents and nonresidents including trade in goods and services, primary income (e.g., investment income and compensation), secondary income (government and private transfers), and financial flows. A component of private transfers is personal transfers, which consist of all current transfers in cash or in kind sent by immigrants in the United States to households abroad, regardless of the proportion of those immigrants who are legally authorized to be in the United States.[1] Guidelines for the compilation of these statistics are promulgated by the International Monetary Fund (IMF) in *Balance of Payments and International Investment Position Manual,* sixth edition. The GAO devotes the second half of its report to an analysis of BEA's estimates of personal transfers. As noted in GAO's report, personal transfers are often referred to as "remittances"; however, they are actually just one component of the broader measure of personal remittances as defined by the IMF.[2]

These comments focus on the development of the current model BEA uses to estimate personal transfers and the adequacy of the estimates derived from this model. They also provide BEA's perspective on key issues raised during GAO's investigation and highlight BEA's most critical concerns with the report.

In brief, BEA does not agree with the report's conclusions that BEA's personal transfers estimates are unreliable or that its documentation is inadequate. We believe that the estimates are valid and reasonable for the purpose for which they are prepared and that the documentation of the development of the methodology and estimates provided to GAO was fully adequate. The fact that GAO was successful in reproducing our estimates clearly demonstrates that our documentation is adequate, as does the scope of GAO's recommendations. We acknowledge that the nature of both the estimates of personal transfers and the documentation of methods used to produce those estimates lend themselves to constant improvement. BEA will draw upon the

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[1] Transfers from the U.S.-born population to households abroad are estimated separately and reported elsewhere in BEA's international transactions accounts.
[2] Personal remittances also include capital transfers between resident and nonresident households and net compensation of employees. Compensation of employees is compensation paid by resident employers to nonresident employees. Net compensation is calculated by deducting taxes and social contributions paid by nonresident workers in the country of employment, and transport and travel expenditures related to their work abroad from gross compensation.

process of providing GAO information, and the materials produced in doing so, to provide more detailed and transparent documentation to its customers. BEA is always striving to improve the accuracy and transparency of its estimates and appreciates the report's suggestions. We intend to implement them to the extent possible consistent with resource limitations as we continuously improve the estimates for all of our economic accounts.

**Background**

We appreciate that GAO was faced with a significant challenge in being asked to measure the potential impact of the WIRE Act. However, BEA's personal transfers estimates were not designed to answer that primary question. Information about the undocumented remitting population is necessary to evaluate the impact of the proposed legislation, and BEA was clear from the beginning of this investigation that we could not provide such information, as our source data for estimating personal transfers indistinguishably combine the documented and undocumented immigrants. Furthermore, our estimates of personal transfers indistinguishably combine wire transfers, which might be subject to the WIRE Act, with other transfer channels, which may not be affected by the WIRE Act. We understood that GAO would be using our estimate of personal transfers as a basis for understanding the magnitude of these cross-border transfers. Therefore, we made every attempt to provide GAO with information to help them understand our methods.

Personal transfers, and remittances more generally, are an important source of income for many recipient countries.[3] However, these transactions are very difficult to measure. Most transfers are small and fall below financial reporting thresholds. In addition, many transactions are in cash or sent through informal channels where there is no paper trail. In recent years, the increasing importance of remittances has fueled demand for more accurate statistics. In 2006, the IMF and the World Bank convened a group of experts from international organizations and national statistical offices to develop standards for compiling statistics on remittances. The Luxembourg Group's work culminated in 2009 with the publication of a guide for statistical compilers. BEA was an active participant of this group and made significant contributions to the guide. The guide recommends a variety of methods to estimate transfers received and sent, including direct data collection and indirect, model-based approaches. The guide explains that approaches that use direct data sources have significant weaknesses. Estimates based on data from banks and money transfer operators will miss funds sent through informal channels. Estimates based on data from these sources will also include funds sent by individuals intended for their own use, such as a "nest egg" if they plan to return to their home country, which should not be included in transfers.[4] Because it is difficult to collect data directly, especially in an economy with liberalized financial markets, BEA uses an economic model to estimate personal transfers sent from the United States. BEA's model-based approach, developed in 2005, was highlighted in the IMF compilers' guide as an example for other countries to follow.

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[3] International Transactions in Remittances: Guide for Compilers and Users. (2009). Washington, DC: IMF.
[4] Moreover, as noted in GAO's 2006 study of remittances, countries that base their estimates of personal transfers on information from the banking sector may overstate their receipts from the United States because the United States is an international banking center and U.S. correspondent banks are often used even if the remitter is not living in or otherwise connected with the United States.

## BEA's Estimation Model & Motivation for Change

BEA's model for estimating personal transfers combines detailed data on the immigrant population in the United States from the American Community Survey (ACS), with remittance rates determined by their demographic characteristics. In 2011, BEA had the opportunity to improve upon the model developed in 2005 by using newly released data on remittances, collected on a one-time supplement to the 2008 Current Population Survey (CPS).[5] Unlike previous studies on remittance behavior, which had focused only on newly legalized immigrants, the CPS collected data on the entire U.S. population regardless of immigration status. The CPS was also a good fit for BEA's work because it collects similar demographic information to the ACS, the source of the population and income data in BEA's model. Therefore, it was straightforward to calculate annual remittance estimates from the annual population data provided by the ACS using the remittance rates by category derived from the CPS data. The data from the CPS supplement allowed BEA to revise the demographic variables and associated remittance rates in the model and improve the geographic distribution of our personal transfers estimates.

The previous model and the improved model have both strengths and weaknesses. A strength common to both is that they allow for changes in the immigrant population to be reflected in changes in the estimates of personal transfers. A weakness common to both is that they rely on fixed remittance rates for given demographic categories within the immigrant population. The relative rates across demographic groups may change over time, so updating the rates using the 2008 CPS was important, regardless of the other benefits of the update. Furthermore, the absolute level of the remittance rates (as opposed to the relative rates) may change over time and may not reflect personal transfers with complete accuracy if there are limitations in the source data used to develop the rates.

The revised model maintains the same general structure as BEA's previous model but changes the demographic factors that determine remittance rates. Importantly, the revised model also features improved allocation of personal transfers by geography. The new model is an improvement because it uses information collected on the CPS to identify the demographic variables that are included in the personal transfers model. The previous model contained three demographic characteristics: time in the United States, presence of children in the U.S. household, and country of birth.[6] BEA used the CPS data to test the usefulness of these demographic categories as predictors of remittances. We also tested several alternative

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[5] In June 2013, another supplement was added to the CPS to ask questions about the unbanked/underbanked population. Respondents were asked about their use of nonbank establishments to send money to relatives and friends outside the United States. BEA is planning to review the results of this inquiry when they become available to see whether the information could be used to further refine BEA's model.

[6] Time in the United States was divided into four categories: "0 to 5 years," "6 to 15 years," "16 to 30 years," and "30 plus years." Predicted remittances decreased as time in the United States increased. Presence of children in the U.S. household was divided into two categories: no children in the household and one or more children in the household. Having children in the household reduced predicted remittances. Country of birth was divided into four separate geographic tiers: low, middle, high, and highest. The country tiers were based on wealth and distance from the United States. Predicted remittances increased from the low country tier (which included high-income countries like Canada, Germany, and the United Kingdom) through the highest country tier (which included mostly Latin American countries). Remittance rates for these characteristics were based on previous survey data on remittances, from the Legalized Population Survey (LPS). The LPS, conducted in the late 1980s and early 1990s, collected data only on newly legalized immigrants.

demographic variables to see whether they were better predictors of remittances. As a result of this analysis, we introduced five changes to the demographic variables for our model:

1. Removed U.S. citizens born abroad of American parents from the remitting population, because the CPS data showed that this group's remittance behavior would be similar to the behavior of the U.S.-born population, a population that is not within the scope of our personal transfers methodology, since its remittances are measured separately;
2. Replaced the "children/no children" category with "married, spouse absent/other marital" because the CPS data showed that marital status was a more powerful predictor of remittances than presence of children;
3. Added the category "living with roommates over 25/other living arrangements" because the CPS data showed that adults with roommates over 25 send more remittances;
4. Combined immigrants who have been in the United States for "16 to 30 years" and immigrants who have been in the United States for "30 plus years" into a single time category, "15 plus years," because the CPS data showed these groups had similar remittance rates; and
5. Reallocated countries within the geographic tiers because we found that our country allocations could be improved to better match the CPS data.

**Data Limitations**

The one-time CPS supplement on remittances asked survey respondents about money they had sent abroad to friends or relatives. This was the first time that information on remittances had been collected from U.S. residents on an official, nationally representative survey. However, the data from the CPS supplement had several shortcomings. First, the data set was limited in size; data from 6,136 households were used in the remittance rate regressions comprising 10,329 adult immigrants. With a larger data set, estimates of remittance rates could have been made separately for each combination of country of origin and other demographic categories (e.g., time in the United States, living arrangements). With the existing smaller data set, many such combinations were not present in the data, and many others were present only in very small numbers.[7] For that reason, BEA had to rely on a model with a small number (4) of country-of-origin groups and a small number of other demographic categories—three groups for time in the United States and four groups for living arrangements (the combination of the "married, spouse absent/other marital" category and the "living with roommates over 25/other living arrangements" category). Even with these limitations in the model, there were not sufficient numbers of observations in each of the 48 groups to generate reliable estimates for each group. In fact, as the GAO report correctly notes, two of these groups had no observations whatsoever. Given these constraints, BEA was compelled to use a parametric model that generated coefficient estimates for each of the 11 variables rather than direct remittance rate estimates for the 48 demographic groups. The number of relevant observations for each of the 11 variables was sufficiently high that data sparseness was less of a concern. The model—which specified how these 11 coefficients were to be combined to generate remittance rate predictions—allowed for estimates to be constructed for the groups in the CPS data that were thin or nonexistent but that do appear in the ACS data. The

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[7] Households used in the regressions contained at least one naturalized citizen adult or non-citizen adult. Although a data set comprising 10,329 individuals may appear to have a very comfortable sample size, sample size quickly becomes an issue when dividing these observations between a large number of countries and subdividing each country sample by a variety of individual demographic characteristics.

GAO report points to this as a serious flaw in the model, but BEA sees this as a necessary feature given the limitations of the source data mentioned above.

For its model, BEA used a multiplicative model instead of an additive model or a model with some other functional form. Both multiplicative models and additive models are standard in the literature, being widely used by econometricians. BEA's selection of a multiplicative model over an additive model was driven primarily by the fact that the multiplicative model explained more of the variation in the data than the additive model. In addition, the multiplicative model was more consistent with BEA's previous model, which was largely multiplicative, and was more attractive conceptually.

A second data limitation was that the CPS data on income and personal transfers were collected at the household level, but BEA's model, in principle, requires individual-level data. For personal transfers, this limitation did not create an insurmountable problem, as each individual's transfers could be conceptually aggregated to form the household-level observation. Income was more problematic. In particular, household income had to be allocated to the individual household members. BEA performed such an allocation using individual-level data from the ACS. This allocation was both simple and fully documented.

Third, the household income reported on the CPS was only available in increments.[8] For instance, if a household had an income of $33,057, the CPS data would only show that income was between $30,000 and $39,999. BEA chose to impute to any such household an income of $35,000—the midpoint of the lower and upper limits. Similarly, for a household with an income reported between $40,000 and $49,999, BEA imputed a value of $45,000. As GAO notes in its report, this is not the only possible way to impute incomes; other reasonable imputation choices may have marginally changed BEA's coefficient estimates. However, this imputation method is as defensible as any other method that could have been used.

Fourth, to preserve confidentiality, household personal transfers were "topcoded" in the CPS data. That is, transfers greater than $10,000 were not explicitly shown. Instead, the CPS data set showed the average value of all transfers greater than $10,000—$27,199—for each observation with transfers greater than $10,000. (For instance, transfers originally reported as $15,000, $25,000, or $40,000 would have each been shown as $27,199 in the CPS data.) This topcoding results in "censored" data, as noted in the GAO report.[9] There are a few different methods available that may be used to mitigate the issues created by censored data. Most familiar among these is the Tobit model. These methods have their own limitations. The Tobit, for instance, assumes normally distributed data, which was not the case with personal transfers in the CPS data. In the end, BEA decided to use the CPS data "as is," acknowledging possible individual

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[8] In some cases, income was not reported at all in the CPS. In those cases, income was imputed based on relationships observed in the ACS between income and age and sex.

[9] The GAO report also identifies what it calls "censoring" associated with the fact that many observations show personal transfers of exactly zero. While this is not exactly censoring, often similar econometric methods are used (e.g., a Tobit model) to deal with such cases showing positive probability mass at zero. Because of the absence of normality in the personal transfers data, BEA's focus on aggregate (not individual) predictions, and an inability to use the multiplicative model in the Tobit context, BEA chose to use a simple least squares procedure.

error for the highest transfers, but aiming for an approximately accurate result in aggregate given the use of the actual average for the topcoded observations.[10]

**Limitations Require Calibration**

Finally, total remittances implied by use of the CPS data were considerably lower than BEA's published estimates for personal transfers, regardless of what model was used to transform data to an aggregate estimate. For several reasons, BEA concluded that underreporting was likely present. Underreporting of personal transfers could arise unintentionally because of less than perfect recall or because the household member responding to the survey was unaware of the transfers made by other household members. It could also arise intentionally if the responding household member reported a smaller value of transfers than actually occurred or if that member reported no transfers when transfers actually occurred. Underreporting—whether intentional or unintentional—is common in consumer surveys[11] and was expected, as described by the Census Bureau.[12] For a survey such as this, survey respondents, many of whom came from countries whose governments were not always benign in interactions with their residents, may have been particularly concerned that their response to a government survey would be used to their disadvantage. As such, withholding information about the existence or extent of their transfers may have been a protective strategy.[13] However, information on underreporting was not sufficient to enable BEA to conclude that the relative distribution of remittances between demographic groups implied by the CPS data was inaccurate.

The correct level of estimates such as these is difficult to ascertain with precision. There are three reasons for concluding that remittance rates calculated with the CPS data and the BEA model (without adjustment) are too low. First, there is a strong suspicion of underreporting. Second, the remittance totals are much lower than other estimates, including BEA's previous estimates, bilateral estimates from other countries, and estimates from international agencies. Third, an "error in variables" situation—due to imperfect reporting of income by CPS respondents, the coarsening by CPS of the income data into increments, and other sources of measurement error —tends to result in a downward bias in coefficient estimates.

The primary benefits of BEA's new method are that it provides a superior geographic allocation of remittance rates and that it better captures the impact of key demographic factors on remittance rates. BEA did not have any evidence that the *level* of the aggregate estimate of

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[10] One possible treatment of the largest remittance values that most likely is worse than either using a Tobit model or imputing with the average of the largest (as done in the CPS data) is to drop these values altogether. The GAO report shows that such a treatment substantially lowers coefficient estimates in BEA's regression, as is to be expected anytime legitimately large values are summarily excluded, particularly for variables as skewed as personal transfers. (An analogy would be to attempting to perform an accurate analysis of the U.S. retail market if Walmart, Kroger, Costco, The Home Depot, Walgreens, and Target were dropped from the sample as "outliers.") Along the same line, the BEA documentation of the model provided to GAO discussed the effect that a larger group of high transfer values—transfers above $5,000—has on the coefficient estimates.

[11] See, for example, Jonathan Rothbaum, "Comparing Income Aggregates: How do the CPS and ACS Match the National Income and Product Accounts, 2007-2012" (2015) and Clint McCully, William Passero, and Thesia Garner, "Understanding the Relationship: CE Survey and PCE" (2013).

[12] "Who in the United States Sends and Receives Remittances" (Grieco, et al. 2010).

[13] For a discussion of respondent unwillingness to report and other difficulties in collecting transfers data on the CPS migration supplement, see G. Patricia de la Cruz and Cassandra Logan, *2008 CPS Immigration/Emigration Supplement Debriefing Report*, Population Division Working Paper No. 99, April 2013, U.S. Census Bureau.

personal transfers based on the prior method was inaccurate in one direction or the other. Given the conclusion that remittance rates calculated with the CPS data are too low, BEA determined that the level of personal transfers based on the new method would need to be adjusted upward to increase their accuracy. Rather than using an arbitrary calibration factor that would produce a revision that could not be strongly defended, BEA calibrated the geographic estimates derived from the new model so that the new aggregate estimate equaled the prior aggregate estimate. This calibration does not imply that BEA considered the previous estimate to be perfectly accurate. Rather, the calibration simply reflects an acknowledgement that the remittance rates implied by the CPS data were manifestly low and the new estimate needed to be scaled upward in the direction of the prior estimate.

Conclusion
BEA appreciates GAO's review and recommendations for further analysis and additional documentation. BEA will continue to review this methodology, as well as all of BEA's estimation methodologies, to ensure that BEA's statistics accurately reflect U.S. economic activity. BEA will also continue to follow established policies and best practices for documenting estimation methodologies and analyses as per GAO's recommendation. That said, we firmly reject GAO's conclusion that our estimates are unreliable. This is simply not the case, and GAO has presented inadequate evidence to support this conclusion and no substantive recommendations for improvement.

In the course of interactions with BEA, GAO requested more detailed information than the standard documentation we make publicly available. BEA worked diligently to provide such information, responding to numerous follow-up questions. When GAO encountered trouble understanding the econometrics or some other particular aspect of our methodology, we undertook additional effort to compose new summaries of the various methods used. In one case, we even provided proofs showing how two different approaches could arrive at the same result. Unfortunately, GAO's report seems to conflate this additional effort with an inadequacy of internal quality controls and initial documentation, erroneously implying that we undertook to create documentation where none originally existed.

BEA considers our current method for estimating personal transfers to be a significant improvement over our previous estimation method. We have a high degree of confidence in the validity of our current estimates of personal transfers. We categorically reject the suggestion in GAO's report that we willfully neglected to follow best practices because we did not consider personal transfers estimates to be "influential." BEA does not dispute that its original documentation could have been improved. However, the Office of Management and Budget (OMB) guidelines cited in GAO's report make it clear that it is the responsibility of each agency to determine best practices that meet OMB guidelines. BEA has fulfilled its responsibilities and has determined that it followed best practices when producing the personal transfers estimates.

As for all government agencies, one of BEA's challenges is to allocate its scarce resources to the most beneficial possible uses. In discussing the personal transfers estimate with GAO, we made the point that personal transfers are a relatively small component of several much larger and much more prominent aggregates, such as primary and secondary income payments and the total of imports of goods and services and income payments. We do appreciate that certain audiences

have particular interest in some of our less prominent accounts, such as the secondary income account containing personal transfers. In an unconstrained world, BEA would be able to provide extensively analyzed and documented estimates for each and every one of our accounts. Nevertheless, BEA proudly stands by the quality of its estimates of personal transfers.

# Appendix III: GAO Contact and Staff Acknowledgments

## GAO Contact

Alicia Puente Cackley, (202) 512-8678, or cackleya@gao.gov

## Staff Acknowledgments

In addition to the contact named above, Marshall Hamlett (Assistant Director); Julie Trinder-Clements (Analyst-in-Charge); Namita Bhatia-Sabharwal; Tarik Carter; Emily Chalmers; David Dornisch; Lawrance Evans, Jr.;  Donald Hirasuna; Cheryl Jones; Madeline Messick; Patricia Moye; Jungjin Park; Oliver Richard; and Jena Sinkfield made key contributions to this report.