Predicting Future GDP Growth: The Macroeconomic Information Content of Corporate Tax Receipts

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ABSTRACT: On the 8th business day of every month, the U.S. Treasury issues the Monthly Treasury Statement (MTS), which summarizes the total receipts and expenditures of the federal government for the preceding month. We investigate whether corporate quarterly estimated tax payments, reported in aggregate on the MTS as corporate tax receipts, predict quarterly nominal gross domestic product (GDP) growth and errors in professional forecasters' expectations of nominal GDP growth. We find that growth in quarterly corporate tax receipts has positive information content for one-quarter-ahead GDP growth that is incremental to aggregate accounting earnings growth and other known economic indicators. We also document that forecasters do not efficiently impound quarterly corporate tax receipts into their GDP forecasts. This association varies predictably by quarter based on institutional details underlying corporate estimated tax payments and the timing of the release of the MTS relative to corporate financial reports. Individual and employment tax receipts generally do not possess information content for GDP growth. We conclude that corporate tax receipts from the MTS represent a low-cost, timely, and routinely available source of macroeconomic information that is useful to policymakers, forecasters, and other economic stakeholders.

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I. INTRODUCTION

Changes in gross domestic product (GDP) are the most comprehensive indicator of an economy's health. Numerous federal policy decisions are based on GDP growth releases, including interest rates set by the Federal Reserve, the size and scope of economic stimulus packages, and trade policies. Federal, state, and local governments also use GDP growth as a primary input into budgeting, making it an important determinant of monetary and tax policies. Financial markets follow GDP releases closely, as the size and direction of GDP changes affect both stock and bond prices (in opposite directions). Business leaders are attuned to GDP changes because the economy's growth rate affects overall business conditions and investment decisions. GDP even affects the public through its implications for unemployment, homeownership, and the market value of a well-diversified retirement portfolio (Ball & Sadka 2015). As a result, quarterly GDP estimates are the "signature piece" of the Bureau of Economic Analysis (BEA)'s National Income and Product Accounts (NIPAs; BEA 2015).[1]

A recent literature stream in accounting finds that quarterly aggregate accounting earnings changes predict future GDP growth, but that professional macroeconomic forecasters do not efficiently impound these earnings changes into their forecasts (Konchitchki & Patatoukas 2014; Gaertner, Kausar, & Steele 2020; Abdalla & Carabias 2022). We anchor on and extend this literature stream by exploring a conceptually similar, yet potentially incrementally meaningful, source of information: gross quarterly corporate income tax receipts.[2] We investigate whether quarterly tax receipts reported on the Monthly Treasury Statement (MTS) predict future GDP growth and GDP growth forecast errors, and whether the association is

[1] https://www.bea.gov/resources/learning-center/what-to-know-gdp

[2] Quarterly tax receipts refer to tax receipts that correspond to the quarterly estimated tax payments of calendar year-end firms (which are paid in specific individual months), not all tax receipts received by the U.S. Treasury during an entire calendar quarter.

incrementally informative to the predictive ability of aggregate accounting earnings and other macroeconomic indicators.

The MTS is released on the 8th business day of every month and provides a summary of governmental receipts and outlays, the surplus or deficit, and the means of financing deficits (e.g., issuance of public debt; Bureau of the Fiscal Service [BFS] 2022). A variety of parties use the MTS and it serves as an essential tool in the federal government's legislative process. For example, the Congressional Budget Office uses the MTS to calibrate its baseline estimates that support the federal budgeting process, economists interpret fluctuations in the government's cash inflows and outflows on the MTS as an indicator of current spending trends and a predictor of monetary policy, and bond market professionals use the MTS to understand the government's short-term financing strategy.

Corporate income tax receipts are reported in the summary of governmental receipts within the MTS and are comprised of all income tax payments remitted to the U.S. Treasury by corporations during the month. The federal income tax is a "pay-as-you-go" system (Internal Revenue Service [IRS] 2022). Much like individuals are required to withhold taxes throughout the year, corporations are required to remit quarterly estimated tax payments equal to 25 percent of the expected liability for the entire current year.[3] As a result, any quarter-over-quarter changes in estimated payments communicate aggregate revisions to expectations about future economic events. We expect these changes in quarterly estimated tax payments, which are identifiable

[3] There is a safe harbor that allows corporations to remit as an estimated payment 25% of the income tax shown on the corporation's return for the previous year. This safe harbor is allowed only for all four estimated payments of corporations with taxable income of less than $1 million for any of the three preceding years and only for the first estimated payment for all other corporations. Corporations are also allowed to determine estimated payments using an annualized income installment method or an adjusted seasonal installment method.

based on the MTS that corresponds to the estimated tax payment due dates, to be a leading indicator of the macroeconomy.

Changes in tax receipts are likely a forward-looking indicator of GDP because of their direct and/or indirect relation to the underlying components of GDP. GDP is not directly estimated; rather, it is constructed from the "bottom up" by aggregating the estimated and final values of its underlying components.[4] The individual components of GDP under the income approach include corporate profits and employee compensation, among others.[5] Estimates of NIPA corporate profits rely primarily on IRS Statistics of Income (SOI) Division income tax return data, which is only available annually and at a two-year lag (BEA 2011). Thus, tax receipts reported on the MTS provide a timely source of information about amounts eventually reported on tax returns and subsequently provided to the BEA. Tax receipts may also be indirectly related to other components of GDP such as employee compensation. For example, increases in tax receipts may reflect improved corporate profitability that has spillover effects to the labor market.

We expect the information content of tax receipts for GDP growth to be incremental to aggregate earnings because the MTS is timelier than accounting earnings releases in all but the first quarter of the calendar year. Further, the information contained in tax receipts is more comprehensive in scope. The corporate profits component of GDP measures the domestic economic activity of the entire population of active C and S corporations in the U.S., and corporate income tax receipts reported on the MTS captures the entity-level tax remitted by both

[4] This is analogous to the construction of financial statement earnings. Financial statement earnings are not directly measured; rather, they are the product of aggregating individual items of income and expense.
[5] GDP is also comprised of interest income, sole proprietorship and partnership income, rental income, indirect taxes less subsidies, and the capital consumption allowance (which is a depreciation measure of the capital stock used in the production process). We discuss the components of GDP in Section II.

corporate forms.[6] By contrast, aggregate accounting earnings reflect the performance of less than one tenth of one percent of active corporations.[7] Finally, the measurement of corporate profits, although distinct from taxable income, is closer in concept to tax reporting rules than Generally Accepted Accounting Principles (GAAP). For example, both corporate profits and taxable income reflect only domestic profits, but GAAP earnings are reported on a worldwide basis. Because of these differences, the BEA reports that quarterly growth rates of corporate profits and the accounting earnings of S&P 500 corporations can differ dramatically (BEA 2011).

We test the association between quarterly tax receipts and future GDP growth using a multivariate regression approach that controls for the most recently available GDP estimate over a period spanning Q1:1988 through Q4:2019. We hand collect corporate income tax receipt data corresponding to the quarterly estimated payments for calendar year-end corporations from the MTS repository on the U.S. Treasury website. We measure changes in quarterly corporate tax receipts as the quarter-over-quarter percentage change in corporate income tax receipts. We find that changes in quarterly corporate tax receipts are a significant positive predictor of nominal GDP growth in the following quarter and that they are incrementally predictive to the aggregate earnings of calendar year-end corporations. The ability of quarterly corporate tax receipt changes to predict GDP growth is robust to the inclusion of other macroeconomic indicators.

We next examine whether professional forecast errors incorporate the information content of quarterly corporate tax receipts into their forecasts of nominal GDP growth by regressing GDP growth forecast errors from the Survey of Professional Forecasters (SPF) on

[6] S corporations do not generally face an entity-level tax, but special rules sometimes levy one on an S corporation's assets. We discuss this in more detail in Section VII and also examine the information content of individual estimated tax receipts, which are comprised at least in part by taxes paid by individuals as a result of passthrough income.

[7] The Federal Reserve Board of Governors reports approximately 4,100 public firms in August 2020 (https://www.federalreserve.gov/econres/notes/feds-notes/the-post-covid-stock-listing-boom-20220617.html) and SOI reports 6.4 million corporate tax returns filed for the 2020 tax year (https://www.irs.gov/pub/irs-pdf/p5655.pdf).

quarterly corporate tax receipt changes, aggregate accounting earnings, and other macroeconomic indicators available at the time of the SPF forecast. We document a significant and positive association between changes in quarterly corporate tax receipts and forecast errors that is robust to the inclusion of aggregate earnings changes and other macroeconomic indicators. The explanatory power of quarterly corporate tax receipts for GDP forecast errors is roughly seventeen times that of aggregate accounting earnings. Further, the association between aggregate earnings changes and GDP forecast errors is insignificant after controlling for the producer price index (PPI), but the ability of corporate quarterly tax receipts to explain GDP forecast errors remains. Overall, our results indicate that corporate tax receipts not only have predictive ability for GDP growth, but also reflect information that is not efficiently impounded into GDP growth forecasts by professional forecasters.

To ensure our results reflect the information content of quarterly corporate tax receipts and not some other macroeconomic indicator, we next examine whether the information content of quarterly corporate tax receipts varies predictably across calendar quarters based on institutional details underlying the determination of estimated corporate tax payments. First, the IRS allows a "safe harbor" based on the prior year tax for the first, and only the first, estimated tax payment of corporations with taxable income greater than $1 million. Second, a large corporation's prior year tax return is often finalized and filed near the time of the current year's third quarter estimated tax payment. Thus, the first and third estimated tax payments are more likely to reflect past events and therefore less likely to predict future GDP growth. Additionally, the time between the MTS release date and earnings release deadlines varies by quarter, and the MTS precedes relatively fewer first quarter earnings announcements. Generally consistent with

expectations, we find that quarterly tax receipts only predict future GDP growth in Q2 and Q4 and that GDP growth forecast errors are systematically predictable in Q2, Q3, and Q4.

Gaertner et al. (2020) and Abdalla and Carabias (2022) investigate the association between aggregate accounting earnings and future GDP by decomposing earnings into earnings before special items and special items. They find that negative accounting earnings growth, and specifically the special items component of earnings, predicts future GDP growth due to asymmetric timeliness (i.e., because accounting earnings reflect bad news faster than good news and the bad news is typically reported via special items). Furthermore, the authors find evidence that professional forecasters factor the information content of earnings before special items, but not special items, into their forecasts. We similarly decompose earnings and find that quarterly corporate tax receipts continue to provide incrementally relevant information about future GDP growth and GDP growth forecast errors. The effect of quarterly tax receipts subsumes the effect of earnings before special items for future GDP growth and the effects of both components of earnings for GDP growth forecast errors.

Finally, we examine whether changes in other types of tax receipts reported on the MTS possess information content for GDP growth. Corporate profits are only one relatively small portion of total GDP, and corporate tax receipts comprise only a small portion of federal receipts reported on the MTS. A significant component of GDP captures business income earned through partnerships or sole proprietorships as well as wages. Changes in individual income tax receipts from individual quarterly estimated payments are likely correlated with the former, while individual tax receipts from employer withholding are likely correlated with the latter. In addition, the MTS reports monthly employment tax receipts which can be informative about both

wages and self-employment income. We find that, unlike corporate tax receipts, individual income tax and unemployment tax receipts are generally not associated with GDP growth.

We identify corporate income tax receipts as a relevant and incrementally informative predictor of GDP growth, extending the literature stream of Konchitchki and Patatoukas (2014), Gaertner et al. (2020), and Abdalla and Carabias (2022). We also find evidence that corporate tax receipts are not included in professional GDP growth forecasts. Although estimating and forecasting the size of the economy is exceedingly difficult, the importance of research that contributes to forecast improvement cannot be overstated given the myriad and magnitude of decisions based on even early estimates of GDP. For example, the Obama administration introduced a stimulus package in 2009 (the American Recovery and Reinvestment Act of 2009) based on early GDP estimates. However, the early GDP estimates understated the scale of the recession, and, in retrospect, many argue the size of the stimulus package was too small.[8]

In contrast to the relative burden of collecting and aggregating firm-level accounting earnings and imposing certain sample restrictions and assumptions, corporate tax receipts reported on the MTS represent a low-cost, timely, comprehensive, and consistent data source that could improve GDP forecasts. This result is also particularly timely as the threat of a possible recession casts a current spotlight on macroeconomic estimates and forecasts. Aside from GDP growth, prior research demonstrates relationships among aggregate earnings and future inflation (Shivakumar 2007), the Federal Reserve's monetary policies (Crawley 2015), and the labor market (Hann, Li, & Ogneva 2021). Our results also suggest that economists and other researchers may be able to use corporate tax receipts as an incrementally informative predictor of

[8] https://www.vox.com/2015/7/31/9076859/gdo-gross-domestic-output

other macroeconomic measures that would contribute to more timely and accurate economic policy information for policymakers, forecasters, and other economic stakeholders.

II. BACKGROUND, PRIOR LITERATURE, AND RESEARCH QUESTIONS

Quarterly Corporate Income Tax Receipts and GDP Growth

GDP is the most significant and closely watched economic indicator. According to the BEA (2015), GDP "is used by the White House and Congress to prepare the federal budget, by the Federal Reserve to formulate monetary policy, by Wall Street as an indicator of economic activity, and by the business community to prepare forecasts of economic performance that provide the basis for production, investment, and employment planning" (p. 1). The BEA releases monthly estimates of GDP and revisions to GDP estimates. Additionally, the Federal Reserve Bank of Philadelphia administers the SPF, a credible and widely utilized survey of professional forecasters' expectations about future macroeconomic measures (Croushore & Stark 2019).

Conceptually, GDP can be computed using three different approaches: the expenditures approach, the income approach, or the production approach (BEA 2022). While the three are conceptually identical measures of the overall economy, each calculation may not match exactly due to different data sources, timing, and estimation methods (BEA 2022). Particularly relevant to this research setting is the income approach (also referred to as gross domestic income, or GDI), which is the sum of business profits, wages, indirect taxes less subsidies, and the capital consumption adjustment, which approximates depreciation of factors of production (BEA 2022).

Underlying the business profits component of GDP is corporate profits, which represent the income from current production earned domestically from all U.S. C and S corporations, as

well as income earned in the U.S. from current production of foreign corporations.[9] The BEA's estimation of NIPA corporate profits begins with SOI corporate tax return data that is available only on an annual basis and with a two-year lag. The conceptual basis of NIPA corporate profits is like that of taxable income, although there are differences between the two. For example, NIPA corporate profits exclude capital gains and losses and bad debt deductions. The wages component of GDP represents income from labor earned by U.S. workers domestically. Income taxes are not included in the corporate profits or taxes component of GDP. Instead, the corporate profits component is computed before deducting income tax expense, and the taxes component reflects taxes on production and imports, which include federal excise taxes, customs duties, state and local sales taxes, and local real estate taxes (BEA 2022).

The accounting literature has only recently begun to investigate the ability of financial statement information to inform the GDP estimation and forecasting process. Konchitchki and Patatoukas (2014) initiate the literature stream with the expectation that aggregate earnings are a timely proxy for the corporate profits component of GDP. They find that aggregate accounting earnings growth is a leading indicator of GDP growth and that professional forecasters' GDP growth forecast errors are predictable based on aggregate accounting earnings growth. This documents a previously unknown macroeconomic association and suggests that professional forecasters do not factor the information contained in aggregate accounting earnings into their forecasts. However, they do not directly test the exact GDP component through which aggregate earnings growth is associated with future GDP growth.[10]

[9] Business profits also include profits earned domestically by passthrough businesses and sole proprietors, interest income and rental income.

[10] A test of individual GDP components requires hand collection of the components from BEA's historic releases of GDP growth and the underlying NIPA accounts, available more recently in individual Excel files for each release and in PDF files for each release prior to the early 2000s. We are currently in the process of hand collecting GDP components for additional tests.

Gaertner et al. (2020) and Abdalla and Carabias (2022) build on Konchitchki and Patatoukas (2014) by investigating the role of asymmetric timeliness. They argue that bad news is reflected in accounting earnings as an accrual before it is realized and reflected in tax filings. As a result, they expect negative earnings growth and special items to be relatively more useful for macroeconomic forecasting than positive earnings growth and earnings before special items. Consistent with expectations, they find that: 1) only negative changes in aggregate accounting earnings growth predict future GDP growth, 2) when earnings is decomposed, special items is the dominant predictor of future GDP growth, and 3) earnings before special items predicts the corporate profits component of GDP, whereas special items contains common information about other macroeconomic indicators.[11]

We introduce corporate quarterly estimated income tax payments to this literature as a novel tax variable that we expect to predict GDP growth. According to the IRS (2022), "the federal income tax is a pay-as-you-go tax" and "a corporation must generally make estimated tax payments as it earns or receives income during its tax year" (p. 4). The estimated tax payments are paid in four installments by the 15th day of the fourth, sixth, ninth, and twelfth months of the tax year. A firm must generally make estimated tax payments totaling at least 100% of its final annual tax liability, with each of the four payments cumulatively amounting to at least 25%, 50%, 75%, and 100% of the final annual tax liability, respectively.[12] When a corporation fails to make adequate estimated tax payments, it is subject to penalties and interest. A hypothetical

[11] Two additional studies analyze the effect of underlying firm-level characteristics on the informativeness of the aggregated values. First, using earnings before extraordinary items, Ball, Gallo, and Ghysels (2019) investigate the effect of firm-level earnings smoothness and find that firms with smoother earnings contribute more information to aggregate earnings and that macro forecasters seem to focus more on firms with smoother earnings when making predictions. Second, a working paper by Gallo, Jim, and Sridharan (2022) finds that aggregated earnings from a small number of "highly macroeconomically exposed" firms predicts future GDP growth.

[12] The estimated tax payment rules for corporations are governed by Internal Revenue Code §6655.

example of a firm and its estimated tax payment process throughout the year is presented in Appendix A.

Notably, a firm does not know its exact tax liability until its tax return for the year is filed, which is typically four to ten months after the final estimated tax payment is due. Thus, payments generally require a firm to estimate its annual tax liability and pay the total incrementally throughout the year; a firm must revise its estimate throughout the year to meet the cumulative payment requirements as actual results unfold and additional or revised information becomes available. Therefore, estimated tax payments reflect a firm's expectations about future economic events and changes in estimated tax payments from quarter to quarter represent revisions in expectations as they occur.[13]

The MTS is published on the 8th business day of each month by the Bureau of the Fiscal Service (BFS), a bureau of the U.S. Department of the Treasury. According to the BFS (2022), each statement "summarizes the financial activities of the federal government" (para. 1) such as receipts, outlays, surpluses, deficits, and means of financing based on information collected from "federal entities, disbursing officers, and Federal Reserve Banks" (para. 2). The MTS reports corporate income tax receipts, which include all income tax payments paid by firms during each reporting month. Thus, the tax receipts reported on each MTS that corresponds to the month of required quarterly estimated tax payments represent an aggregate measure of firm-level quarterly estimated tax payments that is similar in concept and timing to the aggregate measure of firm-level quarterly accounting earnings used in existing literature.

[13] It is for this reason that in our empirical methodology we measure changes in corporate tax receipts as the quarter-over-quarter changes in corporate estimated tax receipts. Because the 25% of the entire annual tax liability must be paid each quarter, observing no change in estimated tax receipts from quarter one to quarter two suggests no unexpected to new items occurred during quarter two to change the expectation of the annual tax liability. Observing a change from one quarter to the next should, therefore, provide additional information about future, or annual, performance.

Prior research finds that accounting earnings growth predicts future GDP growth because it reflects information about future economic events, specifically the corporate profits component of GDP. When the BEA computes annual revisions to GDP estimates (which are different than the GDP estimates released each quarter), it uses actual tax return data to compute corporate profits.[14] However, this data is only provided by SOI at a two-year lag. The fact that the BEA uses stale tax data when computing GDP indicates that tax receipts reported on the MTS can contain predictive content for macroeconomic outcomes. Further, we expect corporate tax receipts to contain incremental information content to aggregate earnings because the measurement convention for determining corporate profits is more similar to that of taxable income than GAAP earnings. In fact, BEA (2011) notes that "[i]t is therefore misleading to directly compare the growth rates of the NIPA measures of corporate profits with those of the S&P 500 [GAAP earnings]…" (p. 26, para. 7).

Furthermore, corporate income tax receipts have several favorable attributes relative to the accounting earnings measures and data used in prior research. The corporate profits component, as well as all other components underlying GDP, represent income from the domestic production of all C and S corporations in the U.S. Corporate income tax receipts reported on the MTS include both public and private firms, whereas accounting earnings measures in prior research are inherently limited to public firms. Because of this coverage difference, NIPA corporate profits tend to be twice as large as the aggregate GAAP earnings of the S&P 500 (BEA 2011). Second, accounting earnings represent worldwide earnings. By contrast, tax receipts reported on the MTS reflect tax liabilities that are more likely to be

[14] As previously noted, NIPA corporate profits are still distinct from aggregate corporate taxable income figures due to various adjustments made to the SOI tax data to arrive at NIPA corporate profits, including capital gains and losses and bad debts. However, these adjustments are less extensive than would be required if adjusting GAAP earnings to NIPA corporate profits (BEA 2011).

connected to activity that occurs within the United States. Thus, corporate income tax receipts provide an opportunity to capture more firms than existing earnings measures as well as portions of economic activity that are specific to the U.S., which are more closely related to GDP.

While we do not expect the two earnings measures to necessarily reflect the same information, there are similarities between book and taxable income that may limit the incremental information content of corporate income tax receipts. Taxable income is fundamentally a function of financial reporting income; generally, firms estimate taxable income by starting with financial reporting income and adjusting it for known or expected book-tax differences.[15] Additionally, corporate tax returns require taxpayers to provide a reconciliation between financial reporting income and taxable income. Thus, though financial reporting and taxable income may be different, it is reasonable to expect taxable income to reflect at least some similar information to financial reporting income. This relationship is backed empirically by Green et al. (2022), who examine tax return data and find that firms' pre-tax income and taxable income are significantly positively correlated.

Given the above discussion, it is reasonable to expect that corporate income tax receipts may predict future GDP growth and provide incrementally relevant information to previously documented macroeconomic indicators (including aggregate accounting earnings). However, this expectation is not without tension. Therefore, our first research question is as follows:

RQ1: Do quarterly corporate income tax receipts predict future GDP growth?

[15] This is the anecdotal experience of one author who prepared estimated payments for a public corporation and is consistent with a recent tax accounting textbook, which states: "To compute taxable income, most corporations begin with book (financial reporting) income…and then make adjustments for book-tax differences to reconcile to the tax numbers" (Spilker et al. 2022, p. 16-3).

Quarterly Corporate Income Tax Receipts and GDP Forecast Errors

It is possible that professional forecasters use tax receipts from the MTS, as tax receipts are relatively quicker and easier to access and compute than aggregate accounting earnings. We also have found no evidence to indicate that the BEA uses the MTS to compute the pre-tax corporate profits component of GDP, which potentially indicates that forecasters do not either.[16] One key consideration with respect to professional forecaster use is timing, specifically the set of information available to professional forecasters at the time they determine their GDP forecasts, including whether the MTS is available and when the MTS is available relative to aggregate earnings releases. Figure 1 and the following discussion provide a comprehensive overview of the timing of each event along with a specific example for a calendar year firm using quarters Q2:2016 through Q1:2017.

In each of the three months after the end of quarter q, the BEA releases an estimate of quarter q's GDP growth—referred to as the advance, second, and third releases, respectively. Though these three estimates relate to activity that occurred in quarter q, they are released during quarter $q+1$ (i.e., they are retroactive measures of economic activity, similar to firms reporting results of operations after the close of each fiscal period). The third estimate is considered the final quarterly estimate of GDP growth for quarter q and is released at the end of quarter $q+1$. For example, the three quarterly estimates of Q3:2016 GDP growth are released throughout Q4:2016 and the final estimate of Q3:2016 GDP growth was released on December 22, 2016.

[16] Our review of the BEA's NIPA methodology indicates that they use the MTS to reconcile their estimates of defense consumption expenditures and gross investment with *outlays* reported on the MTS (https://www.bea.gov/help/faq/1018) and as a control total when estimating one adjustment to corporate profits relating to taxes (BEA 2020).

In the second month of each quarter, SPF forecasts are due. Once the BEA releases the advance estimate of GDP growth for quarter *q* (which occurs during quarter *q+1*), SPF forecasters have approximately one week to submit their GDP growth forecasts to the Federal Reserve Bank of Philadelphia (Croushore & Stark 2019). SPF forecasters provided their estimates of Q3:2016 GDP growth by August 9, 2016.[17] Thus, the SPF forecast error for Q3:2016 is the difference between the final estimate of Q3:2016 GDP growth released by the BEA on December 22, 2016, and the SPF forecast due on August 9, 2016.

Firms file quarterly reports (10-Q) within 40 days of the end of the quarter and annual reports (10-K) within 60 days of the end of the year.[18] Publicly traded companies must regularly file reports of operations in accordance with Securities and Exchange Commission regulations. Accordingly, the firm must publicly report its quarterly results for the first three quarters by May 10, August 9, and November 9, 2016, and its annual results that include the fourth quarter by March 1, 2017. However, firms often report preliminary financial results in advance of 10-Q and 10-K filings, so these dates represent the deadline for reporting earnings, not necessarily the exact date that earnings are publicly released and available to forecasters.

Recall that the novel finding in Konchitchki and Patatoukas (2014) is that accounting earnings growth in quarter *q* predicts GDP growth in quarter *q+1*. Further, even though some accounting earnings for quarter *q* are publicly available at the time that forecasters determine their forecasts for quarter *q+1*, forecasters do not appear to factor this information into their forecasts. As an example using Figure 1, the findings of Konchitchki and Patatoukas (2014) indicate that Q2:2016 accounting earnings growth predicts Q3:2016 GDP growth. Thus, to the

[17] The SPF forecasts include forecasts for the current quarter and the four subsequent quarters (i.e., on August 9, 2016, SPF forecasters submitted GDP growth forecasts for Q3:2016 through Q3:2017). Since our research and prior studies focus on one-quarter-ahead GDP growth, we only include the current quarter in Figure 1.
[18] These are the due dates for large accelerated filers.

extent that Q2:2016 earnings information was available by August 9, 2016 (the due date for SPF forecasts of Q3:2016 GDP growth), one would expect SPF forecasters to include this information in their forecasts. However, Konchitchki and Patatoukas (2014) find that the SPF forecast error for Q3:2016 is predictable based on accounting earnings growth in Q2:2016, suggesting that forecasters do not efficiently include the relevant Q2:2016 earnings information in their forecasts. We extend this research by examining the incremental information content of tax receipts, which are remitted through estimated tax payments and reported on the MTS.

Estimated tax payments are due on the fifteenth day of the fourth, sixth, ninth, and twelfth months of the firm's tax year. Continuing with an example calendar year firm using Figure 1, the firm must make estimated tax payments toward its 2016 tax lability by the 15th days of April, June, September, and December 2016 and must file (or extend the due date of) its 2016 tax return by April 15, 2017. If extended, the firm's final 2016 tax return is due by October 15, 2017. These estimated tax payments will be reflected (aggregated with all firms that made payments) on four MTS publications throughout the year.

Each MTS is published the month after the monthly data it represents, currently on the 8th business day at 2:00 PM Eastern Standard Time (for example, the April MTS is published on the 8th business day of May at 2:00 PM EST). The September MTS is one exception, as it can be published up to 10-15 days later because September is the last month of the federal fiscal year and the BFS requires additional time to compile year-end financial information. Thus, the firm's four estimated tax payments are reflected on the April, June, September, and December MTS. These were published on May 11, July 13, October 14, 2016, and January 12, 2017, respectively.

[Insert Figure 1]

Figure 1 reveals several important timing considerations about estimated tax payments and the MTS in this research setting. Though the timeline in Figure 1 is entirely predictable, the dates for GDP estimates and SPF forecasts are "cleaner" because their general sequence and timing are consistent regardless of the specific calendar quarter. Furthermore, though earnings release deadlines vary, there are always some earnings releases available by the SPF forecast due dates. In contrast, since the first estimated tax payment is due during the fourth month and the remaining three estimated tax payments are due during the sixth, ninth, and twelfth months (i.e., the final three payments are consistently due during the last month of each quarter), the MTS corresponding to the first estimated tax payment is often released after the Q1 earnings deadline and Q2 SPF forecast deadline. While this limits the practicality of using the MTS for one quarter, the MTS precedes earnings and SPF forecast deadlines in the remaining three quarters.

Figure 2 details the percentage of quarterly calendar year firm observations with earnings announcements after the corresponding MTS from 1988 through 2019. As expected, the April MTS is consistently released after most Q1 earnings announcements. Also as expected, the corresponding MTS is consistently released before most Q2, Q3, and Q4 earnings announcements, though Q3 is a bit more nuanced. Recall that the third estimated tax payment is paid in September and reported on the September MTS, which is often released later than the 8th business day of October because of year-end reporting requirements. Over time, the BFS has periodically accelerated the release dates of the MTS to the 8th business day of the month, so the MTS precedes more earnings announcements in recent years. The sharp dip for Q3:2013 reflects an unusual delay in the release of the September 2013 MTS due to the federal government

shutdown. The sharp dip for Q3:2019 reflects a later release of the September 2019 MTS relative to the September MTS in the prior years.[19]

[Insert Figure 2]

Based on the discussion above, we expect the MTS containing corporate income tax receipts associated with quarterly estimated tax payments to be a timely source of forward-looking information available to SPF forecasters. Ultimately, whether they incorporate this information into their forecasts is an empirical question, which we state as follows:

RQ2: Do professional forecasters include tax receipts growth in their GDP forecasts?

III. DATA AND METHODOLOGY

Data Sources and Sample Construction

The BFS provides electronic copies of each MTS on its website and we hand collect corporate income tax receipts from each MTS.[20] Figure 3 presents the average gross corporate income tax receipts by month. Each month's average is computed using data from 1988 through 2019. The greatest average receipts occur in April, June, September, and December, which suggests that most firms follow a calendar year reporting period.[21] March also has relatively greater average receipts—for tax years prior to 2016, the tax return due date for calendar year corporations was March 15. Thus, if a calendar year corporation underpaid (or estimated it had underpaid) its tax throughout the previous year, it paid the remaining balance in March when the return was filed (or extended).[22]

[Insert Figure 3]

[19] The September 2019 MTS was released on October 25, 2019. The September MTS for 2018, 2017, and 2016 was released on October 15, 20, and 14, respectively. If the September 2019 MTS had been released on October 20, 2019, it would have preceded approximately 90% of earnings releases.
[20] February 1954 is the earliest available MTS.
[21] Approximately 67% of firms in the Compustat Preliminary History database are calendar year firms (untabulated).
[22] From 1988-2016, March averages $25 billion in tax receipts. From 2017-2019, which corresponds to the period after the due date change, March averages $15 billion in tax receipts.

Consistent with prior research (Konchitchki & Patatoukas 2014; Gaertner et al. 2020), we focus on calendar year firms. The corresponding estimated tax payments for these firms are reflected on the April, June, September, and December MTS. Underlying detail for tax receipts reported on each MTS is not available; on each MTS, one total amount is reported and this amount reflects all corporate income tax remittances received in that month that are paid by any firm (i.e., estimated tax payments, payments due with final returns, etc.). Thus, the tax receipts amounts used in our empirical analyses may also include payments from non-calendar year firms.[23] However, most firms follow a calendar year reporting period and we do not have a reason to believe these additional firms would systematically affect results.

For empirical analyses, the aggregated first, second, third, and fourth corporate estimated tax payments are aligned with aggregated Q1, Q2, Q3, and Q4 accounting earnings, respectively. We construct the corporate tax receipts variable $\Delta CORPTAXREC_q$ as the quarterly growth in tax receipts using the April, June, September, and December MTS. For example, when q is Q3, the corresponding tax receipts are collected from the September MTS and the growth is computed based on the preceding June MTS; for Q3:2016, $\Delta CORPTAXREC_q$ is computed as the difference between corporate tax receipts reported on the September 2016 and June 2016 MTS scaled by the tax receipts reported on the June 2016 MTS. Following this pattern, Q4:2016 uses the December 2016 and September 2016 MTS, and so on.[24]

[23] For example, the April MTS also includes the second, third, and fourth estimated tax payments for firms with October 31, July 31, and April 30 year ends, as April is the 6th, 9th, and 12th month of these firms' fiscal years, respectively.

[24] One potential concern is that tax rates—rather than taxable income—explain much of the variation in tax receipts. Our sample spans 32 years from 1988 through 2019. For 30 of the 32 years, corporate income tax rates remained largely unchanged (the top marginal tax rate is 34% from 1988-1992 and 35% from 1993-2017 and the changes in underlying brackets are relatively minor). In 2018 and 2019, the final two years of our sample, the corporate income tax rate is a flat 21% as implemented by the Tax Cuts and Jobs Act. Given the consistency of corporate income tax rates in our sample, we do not expect tax rates to explain the variation in tax receipts. Nonetheless, if we restrict the sample to only include 1993-2017 (when the rates and brackets did not change), tax receipts remain incrementally informative to aggregate accounting earnings and other macroeconomic indicators.

The aggregate earnings variable ΔNI_q is the seasonal (year-over-year) difference in aggregated quarterly accounting earnings. For each firm in quarter q, we measure firm-level earnings as the firm's quarterly preliminary net income scaled by the firm's quarterly preliminary sales. At the firm level, we then measure the seasonal difference (i.e., the firm-level difference in earnings between quarters q and q-4) and aggregate the firm-level observations in each quarter with weights based on each firm's market value at the end of quarter q. While our main tests measure aggregate earnings as ΔNI_q, we further decompose ΔNI_q into $\Delta NIBSPI_q$ (earnings before special items) and ΔSPI_q (special items) for additional tests that are discussed in more detail in Section VI.

For earnings data, we use the Compustat Preliminary History dataset, as this dataset provides non-restated financial data that would have been available to forecasters at the time of their forecasts.[25] We begin our sample in Q1:1988, which is the earliest year to construct variables using the Compustat Preliminary History dataset. Our sample ends in Q4:2019 to exclude the extreme GDP and firm performance fluctuations induced by the COVID-19 pandemic. For a firm-quarter observation to remain in the sample, it must: 1) represent a calendar year firm, 2) have non-missing preliminary net income and sales values in the current quarter and same quarter in the prior year, 3) have non-missing shares outstanding and share price values for quarter q, and 4) release earnings within one month following the quarter end date. Firm-level seasonally differenced earnings are winsorized at the 1st and 99th percentiles in each quarter prior to aggregation.

We use seasonal changes in earnings to remain consistent with the prior literature and because seasonal changes in earnings likely contain more, and more relevant, information than

[25] This dataset is used by Konchitchki and Patatoukas (2014) and Gaertner et al. (2020).

quarter-over-quarter changes. We use quarter-over-quarter changes in corporate tax receipts for two reasons. Due to the institutional details underlying the determination of estimated tax payments, quarter-over-quarter changes in corporate tax receipts are more informative about managers' expectations of future earnings. Managers must estimate the expected tax liability for the *entire* year prior to the first estimated payment, and then remit it in four increments throughout the year. For example, a change in $\Delta CORPTAXREC_q$ equal to zero means that the manager's estimate of income for the entire year has not changed and there is no new information to glean from the most recent estimated payment. A nonzero change indicates that the manager has updated their beliefs about the total annual income that has yet to be earned. The interpretation of a seasonal change in quarterly corporate tax receipts is less clear.

To test the association among future GDP, tax receipts, and forecast errors, we estimate the following Ordinary Least Squares (OLS) regressions:

$$GDP_{q+1} = \beta_0 + \beta_1 \Delta NI_q + \beta_2 \Delta CORPTAXREC_q + \beta_k CONTROLS + \varepsilon_q \quad (1)$$

$$ERROR_{q+1} = \beta_0 + \beta_1 \Delta NI_q + \beta_2 \Delta CORPTAXREC_q + \beta_k CONTROLS + \varepsilon_q \quad (2)$$

In both regressions, the variable of interest is $\Delta CORPTAXREC_q$, which represents the quarterly growth in corporate tax receipts. To determine whether corporate tax receipts provide incremental predictive information to aggregate accounting earnings, we also include ΔNI_q in the regressions as well as other macroeconomic controls. Equation (1) tests future GDP growth and Equation (2) tests GDP growth forecast errors. If tax receipts growth provides incrementally predictive information to aggregate accounting earnings and other economic indicators and is not utilized by SPF forecasters, we expect β_2 to be positive and significant in both estimations.

The dependent variables, GDP_{q+1} and $ERROR_{q+1}$, are one-quarter-ahead values for final nominal GDP and GDP forecast errors, respectively.[26] GDP_{q+1} is the third BEA estimate of nominal GDP for quarter $q+1$. $ERROR_{q+1}$ is the third BEA estimate of nominal GDP for quarter $q+1$ (which is GDP_{q+1}) minus the mean SPF forecast of nominal GDP growth for quarter $q+1$. Thus, a positive (negative) value for $ERROR_{q+1}$ indicates that forecasters underestimated (overestimated) GDP growth for quarter $q+1$. The BEA estimates from the Real-Time Data Set for Macroeconomists and the SPF estimates are both provided by the Federal Reserve Bank of Philadelphia.

To continue with a specific example using Figure 1, consider q as Q3:2016. As previously mentioned, $\Delta CORPTAXREC_q$ is the growth in corporate tax receipts computed using the September 2016 and June 2016 MTS, which reflect the aggregated third and second quarterly estimated tax payments. ΔNI_q is the aggregate accounting earnings growth from Q3:2015 to Q3:2016 for all calendar year firms that announced Q3 earnings by October 31, 2016, and meet other previously stated sample restrictions. GDP_{q+1} is the third GDP growth estimate for Q4:2016 that was released on March 30, 2017. $ERROR_{q+1}$ is computed using the difference between GDP_{q+1} and the SPF forecast for Q4:2016 GDP growth that was due on November 8, 2016.

Consistent with Konchitchki and Patatoukas (2014), we also include other macroeconomic indicators in the model. The first two indicators, $YIELD_q$ and $SPREAD_q$, are interest rates. $YIELD_q$ is the market yield on U.S. Treasury securities at 1-year constant maturity, quoted on investment basis and measured on the last business day of the month after quarter q ends. $SPREAD_q$ is the difference between market yield on U.S. Treasury securities at 10-year and

[26] Our inferences about the predictive ability of tax receipts are consistent when using real GDP.

1-year constant maturity, quoted on investment basis and measured on the last business day of the month after quarter q ends. Interest rates are from the Federal Reserve's H.15 dataset. The third indicator is $RETURN_q$, computed as the quarterly buy-and-hold stock market return measured from the last two months of quarter q through one month following the end of quarter q using data from the CRSP Monthly Index Stock file with value-weighted returns that include distributions. The fourth indicator, first used by Abdalla and Carabias (2022), is PPI_q, computed as the quarterly growth in the PPI using data from the Bureau of Labor Statistics. Additionally, we control for the advance nominal GDP growth estimate released by the BEA for quarter q, GDP_q^{adv}. All variables are formally defined in Appendix B.

IV. MAIN RESULTS

Descriptive Statistics

Table 1 presents descriptive statistics for the 126 quarterly observations from Q1:1988 through Q4:2019 (excluding Q4:1995 and Q4:2018).[27] On average, accounting earnings growth is 0.5% (ΔNI_q) and tax receipts growth is 6.8% ($\Delta CORPTAXREC_q$).[28] Tax receipts growth has greater variation, as its standard deviation and range are both larger than accounting earnings growth. Throughout the sample, average future GDP growth is 4.6% (GDP_{q+1}). The mean and median of GDP growth forecast error are both zero ($ERROR_{q+1}$). Thus, while forecasters underestimate and overestimate GDP growth throughout the sample period, on an unconditional basis, they do neither more often than the other.

[Insert Table 1]

[27] There are 128 quarters from Q1:1988 through Q4:2019. Due to federal government shutdowns, advance estimates were not released for Q4:1995 or Q4:2018. Related studies also exclude Q4:1995. Though Q4:2018 is beyond the sample period of related studies, it represents a similar scenario to Q4:1995. There was also a federal government shutdown in October 2013, but Federal Reserve Bank of Philadelphia documentation indicates that the advance estimate for Q3:2013 was not affected, so it remains in the sample.

[28] We note that accounting earnings changes are scaled by sales whereas tax receipts growth is a percentage change.

Table 2 presents correlation coefficients among the variables. Corporate tax receipts growth ($\Delta CORPTAXREC_q$) is positively correlated with both future GDP growth (GDP_{q+1}) and GDP growth forecast errors ($ERROR_{q+1}$), providing initial univariate evidence that tax receipts contain information about future GDP growth and the information is not included in GDP growth forecasts. While earnings measures (ΔNI_q, $\Delta NIBSPI_q$, and ΔSPI_q) are positively correlated with future GDP growth (GDP_{q+1}), they are uncorrelated with GDP growth forecast errors ($ERROR_{q+1}$). This provides initial univariate evidence that accounting earnings growth reflects economic growth, but it is inconsistent with the idea that forecasters don't incorporate this information into their forecasts. The earnings measures (ΔNI_q, $\Delta NIBSPI_q$, and ΔSPI_q) are not correlated with corporate tax receipts growth ($\Delta CORPTAXREC_q$), which suggests that tax receipts may provide incremental information to earnings. Other macroeconomic indicators ($YIELD_q$, $SPREAD_q$, $RETURN_q$, and PPI_q) don't exhibit consistent or reliable correlations with earnings measures (ΔNI_q, $\Delta NIBSPI_q$, and ΔSPI_q) or corporate tax receipts ($\Delta CORPTAXREC_q$) but are generally correlated with future GDP growth (GDP_{q+1}) and uncorrelated with GDP growth forecast errors ($ERROR_{q+1}$). This suggests that the other macroeconomic indicators are informative about future GDP growth and that forecasters incorporate this information into their forecasts.

[Insert Table 2]

Predictions of Future GDP Growth

Table 3 presents multiple specifications for tests of future GDP growth using Equation (1). In all specifications, the advance GDP estimate for quarter q (GDP_q^{adv}) is included as a control. Column (1) replicates the baseline finding of Konchitchki and Patatoukas (2014), indicating that accounting earnings growth predicts future GDP growth. Results indicate that a

one standard deviation change in accounting earnings growth predicts future GDP growth of approximately 0.5%. Column (2) provides a novel baseline finding that tax receipts growth also predicts future GDP growth. Results indicate that a one standard deviation change in tax receipts growth also predicts future GDP growth of approximately 0.5%. In Column (3), both accounting earnings growth and tax receipts growth are included and both remain significant, indicating that tax receipts growth provides predictive information that is incremental to—but does not subsume—accounting earnings growth. The inclusion of $\Delta CORPTAXREC_q$ increases the adjusted R-squared by approximately 19%, indicating that tax receipts are a useful incremental forecasting parameter. Columns (4) and (5) progressively add additional control variables used in prior research and demonstrate that both accounting earnings growth and tax receipts growth continue to provide incremental predictive information about future GDP growth. The positive and significant coefficients for $YIELD_q$, $RETURN_q$, and GDP_q^{adv} are consistent with prior literature. Overall, the results in Table 3 suggest that tax receipts growth predicts future GDP growth and that the predictive content is incremental to accounting earnings growth and other known macroeconomic measures.

[Insert Table 3]

GDP Growth Forecast Errors

Table 4 presents multiple specifications for tests of GDP growth forecast errors using Equation (2). The format and explanatory variables are the same as Table 3. Column (1) replicates the baseline finding of Konchitchki and Patatoukas (2014), indicating that accounting earnings growth systematically predicts GDP growth forecast errors in the same direction as earnings growth (i.e., forecasters routinely underestimate [overestimate] future GDP growth when accounting earnings growth is positive [negative]). Results indicate that a one standard

deviation change in earnings growth corresponds to a GDP growth forecast error of approximately 0.2%. Column (2) indicates that tax receipts growth systematically predicts GDP growth forecast errors in the same way as accounting earnings growth. A one standard deviation change in tax receipts growth corresponds to a GDP growth forecast error of approximately 0.4%. In Column (3), both accounting earnings and tax receipts growth are included and both remain significant, indicating that they both individually provide information that is not included in SPF forecasts. The inclusion of $\Delta CORPTAXREC_q$ increases the adjusted R-squared by a multiple of 19, indicating that tax receipts growth is a useful incremental explanatory parameter. In Column (4), both accounting earnings and tax receipts growth remain positive and significant, indicating that both provide incremental information to three common macroeconomic indicators. In Column (5), PPI_q is included as a control. While tax receipts growth remains significant, accounting earnings growth is no longer significant. Overall, results in Table 4 indicate that tax receipts growth systematically predicts GDP growth forecast errors, suggesting that relevant information in tax receipts growth is not efficiently included in professional forecasts and that this information is incremental to accountings earnings and other known macroeconomic indicators.

[Insert Table 4]

V. CROSS-SECTIONAL VARIATION BY CALENDAR QUARTER

Results thus far indicate that tax receipts growth is incrementally informative on average across all quarters. We next examine whether the informativeness varies based on the specific calendar quarter. Recall from Figure 1 that the relative sequence and timing among MTS release dates, financial reporting due dates, and SPF forecast due dates varies based on the quarter. This suggests that the incremental predictive ability of tax receipts may vary among quarters. Based

on several additional institutional details of the estimated tax payment regime, quarter-level examinations can also provide evidence that tax receipts indeed drive our documented associations.

All firms have the option to pay the first estimated tax payment based on a "safe harbor" amount of 25% of the prior year tax.[29] Therefore, to the extent that firms use this safe harbor, the first quarter estimated tax payment does not explicitly reflect expectations about the future, which implies that the first estimated tax payment may not be informative about Q2 GDP growth. Furthermore, the April MTS is often released after most firms' earnings announcements and the corresponding SPF forecast due date, which precludes forecasters from using the April MTS in their forecasts.

Additionally, until a firm's tax return is finalized, the firm is essentially relying on estimates for both its prior year and current year tax liabilities. All firms have the option to automatically extend the due dates of their tax returns and it is common for large firms to do so, as they are more likely to need additional time to complete their relatively more complex tax returns. The extended due date of the return for calendar year firms is September 15 for tax years prior to 2016 and October 15 for tax years 2016 and later. Accordingly, large firms are likely to finalize their prior year tax returns during or near Q3, around the time of the third estimated tax payment. To the extent that a firm was expecting an overpayment on its prior year return to cover some of the tax liability for the current year, the third estimated tax payment will likely contain a "true up" element that reflects the effect of past events, not future events. Interestingly, an increased (decreased) third payment in this case does not reflect the expectation that *future* taxable income will be higher (lower), but rather that *past* taxable income was higher (lower)

[29] Large corporations (defined as those with at least $1 million in taxable income) cannot use the prior year safe harbor for the remaining three quarterly payments.

than expected. Therefore, the third estimated tax payment is also less likely to reflect Q4 GDP growth.

To test these expectations, we partition the sample into the four different quarters and estimate the full models for future GDP growth and GDP growth forecast errors in each subsample. The results are presented in Table 5. For example, Columns (1) and (2) present the Q1 subsample, which contains all quarterly observations for which quarter q is Q1; ΔNI_q is seasonal earnings growth between Q1 of the current year and previous year and $\Delta CORPTAXREC_q$ is corporate tax receipts growth computed using the April and December MTS. ΔNI_q and $\Delta CORPTAXREC_q$ have the same values as the previous tests. Results suggest that associations indeed vary among quarters for both accounting earnings growth and tax receipts growth. Tax receipts growth predicts future GDP growth in Q2 and Q4 (the second and fourth estimated tax payments), but not in Q1 and Q3 (the first and third estimated tax payments). This is consistent with the previously discussed institutional details of the estimated tax payment regime, as the first and third estimated tax payments likely reflect considerable information about past events rather than future events. Further, the MTS that corresponds to Q1 earnings and the following SPF forecast is not timely relative to accounting earnings releases.

Results also suggest that GDP forecast errors are predictable based on tax receipts growth in Q2, Q3, and Q4, though Q3 has a negative coefficient. If corporate tax receipts growth explains the forecast errors, we expect insignificant (significant) coefficients on $\Delta CORPTAXREC_q$ for Q1 and Q3 (Q2 and Q4) since tax receipts growth does not (does) predict GDP growth in those quarters. Thus, results for Q1, Q2, and Q4 are consistent with these expectations. However, Q3 shows a negative and significant coefficient for forecast errors, suggesting that forecast errors are predictable in the opposite direction of tax receipts growth. If

forecasters used tax receipts in their forecasts, this would be consistent with misinterpreting the implication of the "true up" portion of the third estimated tax payment; a larger third estimated tax payment likely represents unexpected additional tax that was due for the prior year, not additional tax due for the current year, and vice versa. However, results thus far do not suggest that forecasters use tax receipts, so we do not claim that they use them only in Q3 (and interpret them incorrectly). Furthermore, the relatively stronger results in Q4 are consistent with firms having more time to release Q4 earnings, and thus fewer earnings results being available when the SPF forecasters submit their forecasts. Overall, results in Table 5 generally provide evidence that the associations documented in the initial tests are driven by tax receipts.

[Insert Table 5]

VI. SPECIAL ITEMS

As previously mentioned, two recent papers further explore the predictive ability of accounting earnings growth by examining the role of special items in financial accounting: Gaertner et al. (2020) and Abdalla and Carabias (2022).

Gaertner et al. (2020) investigate the role of asymmetric timeliness, as previous literature documents that accounting earnings reveal bad economic news faster than good economic news. The authors note that asymmetric timeliness at the firm level most prominently manifests through conditional conservatism, which is reflected in accounting special items. Consistent with this, the authors decompose aggregate accounting earnings into "core income" (i.e., earnings before special items) and special items and find that only negative changes in aggregate special items predict future GDP growth and forecast errors. Additionally, the authors find that the negative growth in aggregate special items only predicts the wage component of GDI, which

they deem a "puzzling null finding" (p. 1403) given the assumption that the association manifests through corporate profits.

Abdalla and Carabias (2022) further investigate the role of aggregate special items and the underlying components of GDI. The authors find that aggregate special items and aggregate earnings excluding special items both predict future GDP growth, but aggregate special items has dominant predictive power. Further tests indicate that macro forecasters factor the information content of aggregate earnings excluding special items into their forecasts, but consistently underreact to aggregate special items. Consistent with this, the authors contend that "[a]necdotal evidence suggests that economists tend to perceive special items as mere corrections of accounting errors that lack economic content" (p. 2) and note that the BEA's construction of corporate profits excludes special items. Additionally, the authors find that aggregate earnings before special items is informative about corporate profits, whereas aggregate special items is informative about future economic growth factors that are unrelated to corporate profits.

Given the role of special items documented in recent literature, we next analyze whether the predictive ability of tax receipts changes when accounting earnings is decomposed into components that exclude and include special items. Notably, "special items" is a Compustat value that does not necessarily match what firms report as "special items" on public disclosures. Compustat's data dictionary lists twenty different items that it considers special items such as disaster losses, goodwill impairments, restructuring charges, and write-downs of assets; the measure is generally intended to capture nonrecurring events. Thus, it is unclear whether forecasters would utilize "special items," let alone aggregate them consistently with Compustat.

That said, consistent with Abdalla and Carabias (2022), we restrict the sample to firm-quarters with nonzero values of special items values in Compustat. We then decompose ΔNI_q

into two components: earnings before special items ($\Delta NIBSPI_q$) and special items (ΔSPI_q). Both components are measured consistently with ΔNI_q; at the firm level, earnings before special items and special items are both scaled by sales and the firm-level seasonal differences are aggregated to quarterly values using each firm's market value. Firm-level values of $\Delta NIBSPI_q$ and ΔSPI_q are winsorized at the 1st and 99th percentiles in each quarter-year.

Nonrecurring items in financial reporting, especially noncash charges such as impairments, often involve book-tax differences that eliminate or reduce the financial reporting effect when computing taxable income. Therefore, we expect that special items in financial reporting are less likely to be reflected in taxable income; when earnings is decomposed into earnings before special items and special items, we expect that tax receipts reflect similar information as earnings before special items.

Table 6 presents multiple specifications for tests of future GDP growth using Equation (1) modified to decompose earnings into $\Delta NIBSPI_q$ and ΔSPI_q. Column (1) indicates that both earnings before special items and special items are informative about future GDP growth. Column (2), which presents the same specification as the same column in Table 3, is shown for reference and indicates that tax receipts growth is informative about future GDP growth. Column (3) indicates that, even when accounting earnings is decomposed into earnings before special items and special items, tax receipts growth continues to be incrementally informative about future GDP growth. When additional controls are included in Columns (4) and (5), tax receipts growth continues to be incrementally informative about GDP growth. Notably, while special items continue to be informative about future GDP growth as well, earnings before special items becomes insignificant. This is consistent with our prediction. Overall, results in Table 6

demonstrate that tax receipts are still informative about future GDP growth even when earnings is decomposed into potentially more informative components.

[Insert Table 6]

Table 7 presents multiple specifications for tests of GDP growth forecast errors using Equation (2) modified to decompose earnings into $\Delta NIBSPI_q$ and ΔSPI_q. Column (1) indicates that both earnings before special items and special items systematically predict GDP forecast errors. Column (2), which presents the same specification as the same column in Table 4, is shown for reference and indicates that tax receipts growth also systematically predicts GDP growth forecast errors. In Column (3), when the decomposed earnings components and tax receipts are included, tax receipts growth and earnings before special items continue to systematically predict GDP forecast errors. As additional controls are included in Columns (4) and (5), tax receipts growth continues to systematically predict GDP forecast errors. Overall, results in Table 7 suggest that the relevant predictive content of tax receipts is not efficiently impounded into GDP growth forecasts.

[Insert Table 7]

VII. ADDITIONAL SOURCES OF TAX RECEIPTS

Corporate tax receipts represent only a portion of government receipts on the MTS. In 2023, corporate tax receipts were the third largest source of tax receipts. The two largest sources of federal tax receipts are individual income taxes and employment taxes.[30] Similarly, corporate activity represents only a portion of the total economic activity measured under either the expenditure or the income approach, as each also incorporates economic activity arising from

[30] Individual income taxes comprised approximately 49%, employment taxes comprised approximately 36.4%, and corporate income tax receipts comprised approximately 9.5% of total federal receipts in 2023. The remaining 5% represents the sum of excise tax, customs duties, miscellaneous, and estate and gift tax receipts. See the September 2023 MTS: https://www.fiscal.treasury.gov/files/reports-statements/mts/mts0923.pdf.

individuals via private consumption (GDP) or wages (GDI). Therefore, it is reasonable to expect that changes in individual and employment tax receipts reported in real-time on the MTS may inform estimates of future GDP.

Further, NIPA corporate profits that underlie GDP estimates are intended to capture economic activity across all corporate entities, including S corporations. Corporate tax receipts on the MTS reflect only entity-level taxes that are remitted primarily by C corporations because S corporations are pass-through entities that generally do not face an entity-level tax.[31] S corporations outnumber C corporations nearly three to one (Tax Foundation 2017), so corporate tax receipts represent an incomplete proxy for economic activity through the corporate form. Individual income tax receipts reported on the MTS, particularly those that relate to estimated payments as opposed to employer withholding, can be informative about economic activity occurring through the S corporation form. Individual tax receipts related to estimated tax payments likely also capture economic activity generated through other passthrough entities—such as partnerships—that is informative to GDP estimates.

To empirically assess the incremental information content of individual income tax receipts and employment tax receipts, we hand collect them from the MTS similar to our process for corporate tax receipts. Federal individual tax receipts withheld and remitted by employers are reported separately from individual tax receipts in the form of estimated payments in Table 4 of the MTS. The latter, reported as "other individual income taxes" on the MTS, allows us to approximate individual income tax owed on sources other than wages, such as a business enterprise. Although all sources of employment taxes are reported on the MTS, we collect and

[31] Under IRC §1374, S corporations may face an entity-level tax if the S corporation was previously a C corporation. In this case, an S corporation is required to pay an entity-level tax on "built-in" gains (or unrealized appreciation in the value of existing assets at the time of conversion).

consider the total "social insurance and retirement receipts," which is comprised of both employment and general retirement receipts, unemployment insurance tax receipts, and other retirement receipts.

Since employers remit individual income taxes withheld and employment taxes to the U.S. Treasury at least monthly (and at most daily), we construct quarterly withholding and employment tax totals by summing monthly receipts across calendar quarters to align with the quarterly measurement convention of GDP. We then calculate the quarter-over-quarter percentage change in individual income taxes withheld (*ΔINDIV_WH*) and employment taxes (*ΔEMPLOY_TAX*). Required individual estimated income tax payments follow a similar payment schedule to estimated tax payments for calendar year-end corporations for the first three quarters (payments are due on April 15, June 15, and September 15). The fourth quarter estimated payment for individuals is due January 15 of year *t+1* for a given year *t* (as opposed to December 15 of year *t* for a calendar year-end corporation). Thus, the MTS corresponding to the month of each individual estimated payment due date reflects payments associated with economic activity occurring over the previous calendar quarter. As a result, we measure the change in individual estimated tax receipts (*ΔINDIV_EST*) as the quarter-over-quarter change using only the "other" individual tax receipts as reported on the April, June, September, and January MTS, which is consistent with our methodology for computing changes in corporate tax receipts.

Figure 4 presents the average monthly gross receipts of individual tax withheld, individual estimated tax payments, and total employment taxes from 1988 through 2019. As expected, individual withholding and employment taxes are relatively stable month-to-month. Conversely, individual estimated tax payments spike in April, June, September, and January,

which correspond to the due dates of the four individual estimated tax payments throughout the year.

[Insert Figure 4]

We report the results assessing the information content of individual tax receipts and employment tax receipts for future GDP in Table 8. The information content of changes in each additional tax receipt in isolation is presented in odd-numbered columns. Neither *ΔINDIV_WH* nor *ΔINDIV_EST* exhibit an association with future GDP growth that is significantly different from zero. This suggests that changes individual income tax withholding, which reflects changes in both wages and the personal consumption capacity of individuals in the U.S., does not provide information about GDP growth that is not already captured by other parameters in Equation (1). *ΔEMPLOY_TAX* is also not associated with future GDP growth. Furthermore, Columns (2), (4), and (6) indicate that corporate tax receipts remain a statistically significant predictor of GDP when individual tax withholding, individual estimated payments, and employment taxes are included in the model. In Column (4), individual estimated payments and corporate tax receipts are both positive and statistically significant predictors of GDP. Therefore, our results generally suggest that individual forecasters would not benefit from incorporating these additional individual tax and employment tax parameters into their estimates of GDP growth. In untabulated analyses, we also confirm that changes in federal receipts from individual income taxes and employment taxes are not associated with GDP forecast errors.

[Insert Table 8]

VIII. CONCLUSION

We document that corporate tax receipts can predict future GDP growth and GDP growth forecast errors, suggesting that tax receipts contain relevant macroeconomic information and that

this information is not utilized efficiently by professional forecasters. Furthermore, these associations are incrementally informative to other known macroeconomic indicators, including aggregate financial statement earnings. These associations generally vary predictably by quarter and continue to hold when earnings is decomposed into earnings before special items and special items. Tax receipts reported on the MTS represent a low-cost, timely, and consistent data source. Given that prior research also demonstrates associations among aggregate earnings and other macroeconomic indicators, our results potentially allow for more timely and accurate economic information for policymakers, economists, and other stakeholders for macroeconomic measures beyond future GDP growth.

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Appendix A
Estimated Tax Payment Computation Example

Consider the following year for hypothetical Corporation A:

		1st	2nd	3rd	4th
A	Estimated Annual Tax Liability	$100,000	$106,000	$104,000	$110,000
B	Cumulative Percentage Required	25%	50%	75%	100%
C	Cumulative Amount Required	$25,000	$53,000	$78,000	$110,00
D	Cumulative Amount Paid	$0	$25,000	$53,000	$78,000
E	Quarterly Payment	$25,000	$28,000	$25,000	$32,000

For the first payment, Corporation A estimates its total annual tax liability to be $100,000 [**A**]. For the first payment, Corporation A must pay 25% of its estimated total annual tax liability [**B**]. Thus, Corporation A must pay at least $25,000 through Q1 [**C** = A × B]. Since this is the first payment, Corporation A has not made any payments for the tax year [**D =** Sum of all previous D]. Thus, Corporation A pays $25,000 [**E** = C - D].

For the second payment, Corporation A now estimates its total annual tax liability to be $106,000. Corporation A must cumulatively pay at least 50% of its estimated total annual tax liability. Thus, Corporation A must cumulatively pay at least $53,000. Corporation A already paid $25,000, so it pays the $28,000 difference.

This pattern continues for the third and fourth payments.

Appendix B
Variables

VARIABLE	DEFINITION
ΔNI_q	Seasonal (year-over-year) difference in aggregated quarterly net income. Firm-level earnings computed as preliminary reported net income [niq_p] scaled by sales [saleq_p]. Aggregated based on firm market value at the end of quarter q [PRC × SHROUT] using CRSP Monthly Stock file.
$\Delta NIBSPI_q$	Seasonal (year-over-year) difference in aggregated quarterly net income before special items. Firm-level earnings computed as preliminary reported net income [niq_p] less special items [spiq_p], scaled by sales [saleq_p]. Aggregated based on firm market value at the end of quarter q [PRC × SHROUT] using CRSP Monthly Stock file.
ΔSPI_q	Seasonal (year-over-year) difference in aggregated quarterly special items. Firm-level special items computed as preliminary reported special items [spiq_p] scaled by sales [saleq_p]. Aggregated based on firm market value at the end of quarter q [PRC × SHROUT] using CRSP Monthly Stock file.
$\Delta CORPTAXREC_q$	Quarterly growth in gross corporate income tax receipts. Computed as receipts for quarter q less receipts for quarter $q-1$, scaled by receipts for quarter $q-1$. Quarters 1, 2, 3, and 4 correspond to the April, June, September, and December MTS, respectively.
GDP_{q+1}	The third quarterly estimate of nominal GDP growth for quarter $q+1$, obtained from the Real-Time Data Set for Macroeconomists published by the Federal Reserve Bank of Philadelphia.
$ERROR_{q+1}$	Forecast error of nominal GDP growth for quarter $q+1$. Computed as the difference between the third quarterly estimate of nominal GDP growth for quarter $q+1$ (GDP_{q+1}) and the mean SPF forecast of $q+1$ nominal GDP growth submitted in $q+1$ (the "nowcast" in each quarterly SPF forecast).
GDP_q^{adv}	The advance estimate of nominal GDP growth for quarter q, obtained from the Real-Time Data Set for Macroeconomists published by the Federal Reserve Bank of Philadelphia.
$YIELD_q$	Market yield on U.S. Treasury securities at 1-year constant maturity, quoted on investment basis. Measured on the last business day of the month after quarter q ends. Obtained from the Federal Reserve's H.15 dataset.

$SPREAD_q$	Difference between market yield on U.S. Treasury securities at 10-year and 1-year constant maturity, quoted on investment basis. Measured on the last business day of the month after quarter *q* ends. Rates obtained from the Federal Reserve's H.15 dataset.
$RETURN_q$	Quarterly buy-and-hold stock market return measured from the last two months of quarter *q* through one month following the end of quarter *q*. Obtained from the CRSP Monthly Index Stock file using value-weighted returns that include distributions.
PPI_q	Quarterly growth in Producer Price Index (All Commodities) reported by the Bureau of Labor Statistics. Converted from a monthly index to a quarterly index by averaging the three monthly levels in each calendar quarter and computing the growth in the average level from quarter *q-1* to quarter *q*.
$\Delta INDIV\_WH_q$	Quarterly growth in gross individual income tax receipts from withholdings. Computed as receipts for quarter *q* less receipts for quarter *q-1*, scaled by receipts for quarter *q-1*. Quarters 1, 2, 3, and 4 correspond to the sum of amounts reported in the monthly MTSs for a calendar quarter. For example, quarter 1 receipts are equal to the sum of individual income tax receipts from withholding reported in the January, February, and March MTS.
$\Delta INDIV\_EST_q$	Quarterly growth in gross individual estimated tax receipts. Computed as other individual tax receipts for quarter *q* less receipts for quarter *q-1*, scaled by receipts for quarter *q-1*. Quarters 1, 2, 3, and 4 for a given year *t* correspond to the April, June, and September MTS for year *t* and the January MTS for year *t+1*, respectively.
$\Delta EMPLOY\_TAX_q$	Quarterly growth in gross employment tax receipts. Computed as receipts for quarter *q* less receipts for quarter *q-1*, scaled by receipts for quarter *q-1*. Quarters 1, 2, 3, and 4 correspond to the sum of amounts reported in the monthly MTSs for a calendar quarter. For example, quarter 1 receipts are equal to the sum of individual income tax receipts from withholding reported in the January, February, and March MTS.

Figure 1
Timeline of Events

CALENDAR QTR	**Q2:2016**			**Q3:2016**			**Q4:2016**			**Q1:2017**		
MONTH	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**
GDP estimates for:	Q1:2016			Q2:2016			Q3:2016			Q4:2016		
Released on the:	28th	27th	28th	29th	26th	29th	28th	29th	22nd	27th	28th	30th
SPF forecast for:	Q2:2016			Q3:2016			Q4:2016			Q1:2017		
Due on the:		10th			9th			8th			7th	
10-Q/10-K Due		10th			9th			9th				1st
Est. Tax Payment Due	15th		15th			15th			15th			
MTS Released		Apr. MTS 11th		Jun. MTS 13th			Sep. MTS 14th			Dec. MTS 12th		

Figure 1 presents a timeline of GDP estimates, SPF forecasts, 10-Q/10-K due dates, estimated tax payment due dates, and MTS releases over four calendar quarters. The GDP estimate release dates are from the BEA's new archive. The SPF forecast due dates are from the Federal Reserve Bank of Philadelphia's website.

Figure 2
Percentage of Quarterly Observations with Earnings Release After MTS Release

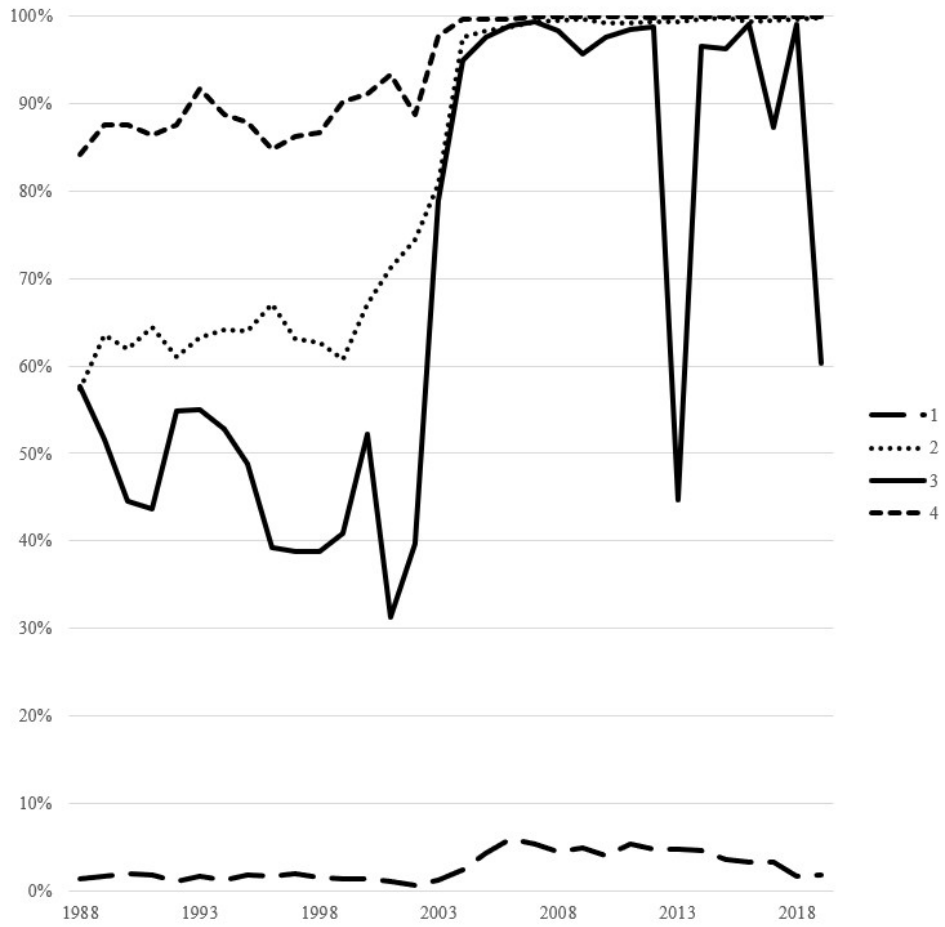

Figure 2 presents the percentages of quarterly calendar year firm observations with an earnings release date after the corresponding MTS release date, separated for each calendar quarter. These percentages are computed using firms in the Compustat Preliminary History database with non-missing earnings release dates.

Figure 3
Average Gross Corporate Income Tax Receipts by Month

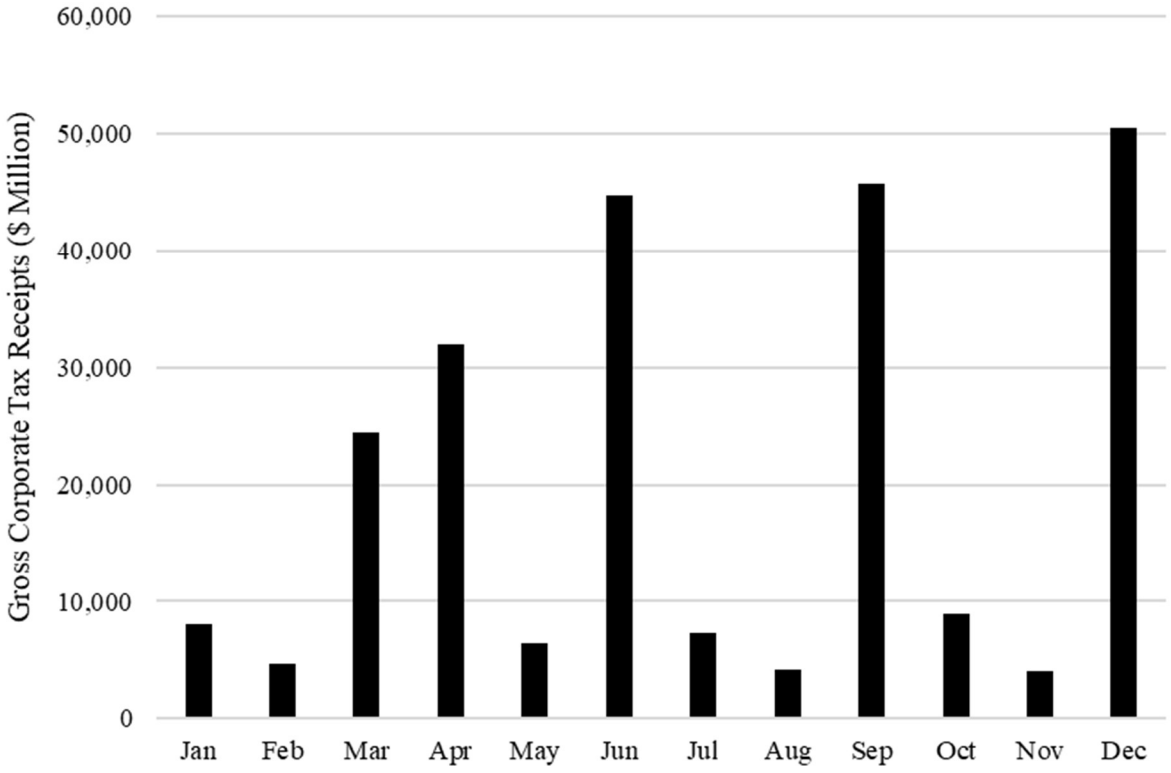

Figure 3 presents the average gross corporate income tax receipts for each month using receipts from 1988 through 2019.

Figure 4
Average Other Gross Receipts by Month

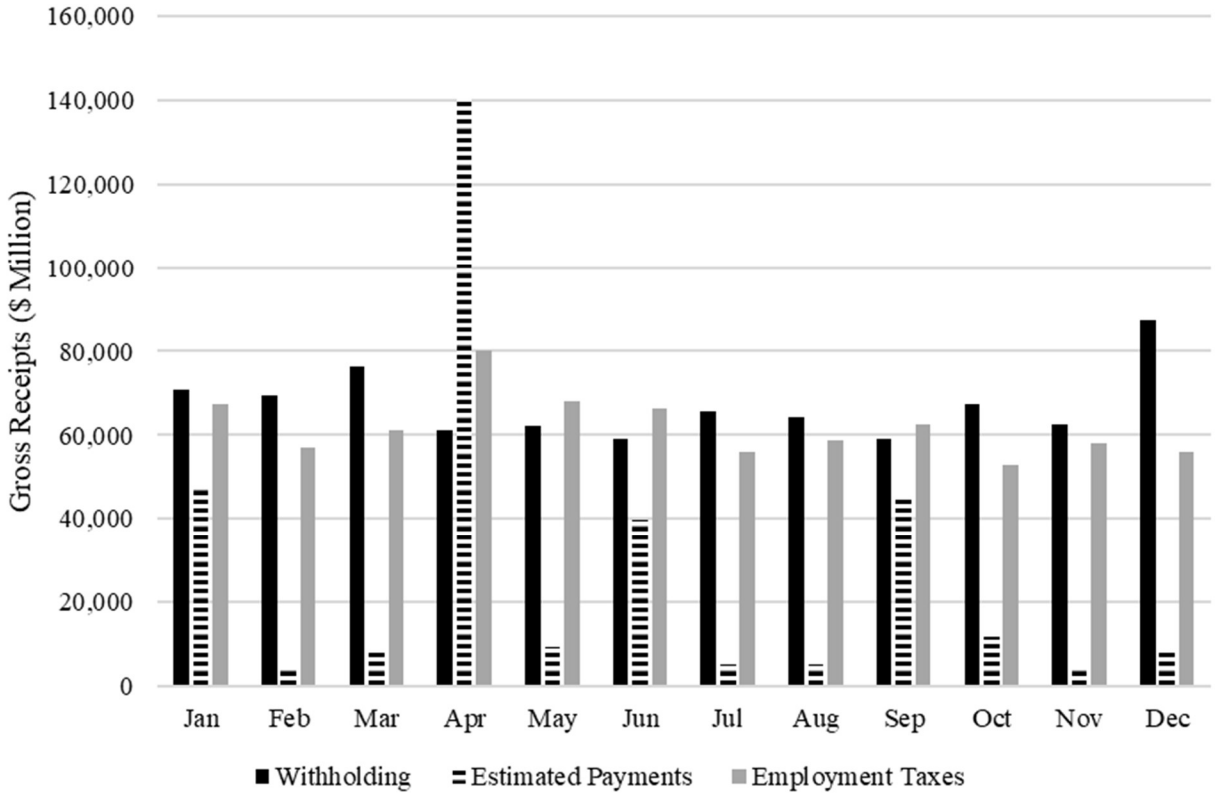

Figure 4 presents the average gross receipts for individual withholding, individual estimated payments, and employment taxes for each month from 1988 through 2019.

Table 1
Descriptive Statistics

VARIABLE	Mean	SD	Min	P10	P25	P50	P75	P90	Max
ΔNI_q	0.005	0.027	-0.090	-0.023	-0.007	0.005	0.016	0.030	0.128
$\Delta NIBSPI_q$	0.007	0.054	-0.339	-0.039	-0.011	0.007	0.021	0.051	0.202
ΔSPI_q	0.012	0.131	-0.350	-0.047	-0.018	0.001	0.017	0.063	1.009
$\Delta CORPTAXREC_q$	0.068	0.403	-0.698	-0.366	-0.188	0.054	0.247	0.482	3.011
$\Delta INDIV\_WH_q$	0.015	0.116	-0.226	-0.164	-0.066	0.032	0.093	0.160	0.257
$\Delta INDIV\_EST_q$	0.354	0.975	-0.766	-0.716	-0.513	0.139	0.478	2.076	2.548
$\Delta EMPLOY\_TAX_q$	0.024	0.155	-0.216	-0.182	-0.123	0.036	0.161	0.198	0.372
GDP_{q+1}	0.046	0.025	-0.058	0.022	0.035	0.046	0.062	0.075	0.100
$ERROR_{q+1}$	0.000	0.018	-0.070	-0.019	-0.012	0.000	0.012	0.022	0.047
GDP_q^{adv}	0.045	0.021	-0.041	0.020	0.035	0.046	0.058	0.068	0.097
$YIELD_q$	0.033	0.026	0.001	0.002	0.007	0.033	0.054	0.066	0.094
$SPREAD_q$	0.014	0.011	-0.003	0.001	0.005	0.014	0.023	0.029	0.034
$RETURN_q$	0.027	0.068	-0.257	-0.053	-0.015	0.038	0.072	0.096	0.204
PPI_q	0.005	0.019	-0.112	-0.014	-0.001	0.007	0.016	0.022	0.066

Table 1 presents descriptive statistics for the 126 quarterly observations from Q1:1988 through Q4:2019. Quarters Q4:1995 and Q4:2018 are excluded because federal government shutdowns precluded the release of advance GDP estimates. Variables are formally defined in Appendix B.

Table 2
Correlation Coefficients

	VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	ΔNI_q	1.00													
(2)	$\Delta NIBSPI_q$	**0.44**	1.00												
(3)	ΔSPI_q	**0.26**	-0.12	1.00											
(4)	$\Delta CORPTAXREC_q$	0.04	0.06	0.03	1.00										
(5)	$\Delta INDIV\_WH_q$	0.07	0.07	0.05	**-0.21**	1.00									
(6)	$\Delta INDIV\_EST_q$	0.02	-0.08	-0.01	**-0.63**	**0.36**	1.00								
(7)	$\Delta EMPLOY\_TAX_q$	-0.01	-0.06	0.00	-0.02	**-0.52**	**0.22**	1.00							
(8)	GDP_{q+1}	**0.31**	**0.17**	**0.18**	**0.17**	-0.03	0.01	0.15	1.00						
(9)	$ERROR_{q+1}$	0.11	0.14	0.06	**0.20**	-0.02	-0.02	0.07	**0.79**	1.00					
(10)	GDP_q^{adv}	**0.33**	0.00	**0.19**	-0.12	-0.04	0.07	0.03	**0.40**	-0.03	1.00				
(11)	$YIELD_q$	-0.04	0.01	0.13	-0.04	0.00	0.01	0.06	**0.34**	0.07	**0.46**	1.00			
(12)	$SPREAD_q$	0.10	0.08	-0.06	0.08	-0.02	-0.05	-0.01	**-0.15**	-0.02	**-0.31**	**-0.58**	1.00		
(13)	$RETURN_q$	**0.21**	**0.24**	0.06	0.05	0.10	0.10	0.11	**0.32**	**0.17**	0.03	0.07	-0.05	1.00	
(14)	PPI_q	**0.36**	0.08	0.09	0.04	**-0.18**	-0.07	0.12	**0.29**	0.00	**0.44**	0.12	-0.02	-0.01	1.00

Table 2 presents Pearson correlation coefficients among variables. Bolded coefficients represent statistical significance at the 10% level. Variables are formally defined in Appendix B.

Table 3
Predictions of GDP Growth

	(1)	(2)	(3)	(4)	(5)
			GDP_{q+1}		
ΔNI_q	0.182*	—	0.167*	0.151**	0.126*
	(1.92)	—	(1.86)	(2.11)	(1.71)
$\Delta CORPTAXREC_q$	—	0.013***	0.012***	0.011***	0.011***
	—	(3.12)	(3.08)	(3.40)	(2.92)
$YIELD_q$	—	—	—	0.240**	0.241**
	—	—	—	(2.18)	(2.13)
$SPREAD_q$	—	—	—	0.146	0.130
	—	—	—	(0.68)	(0.60)
$RETURN_q$	—	—	—	0.091**	0.094**
	—	—	—	(2.34)	(2.44)
PPI_q	—	—	—	—	0.148
	—	—	—	—	(1.36)
GDP_q^{adv}	0.381***	0.486***	0.415***	0.303***	0.250**
	(4.30)	(5.39)	(5.79)	(3.03)	(2.08)
Constant	0.028***	0.023***	0.026***	0.019***	0.020***
	(6.17)	(4.76)	(6.85)	(2.84)	(3.05)
Observations	126	126	126	126	126
Adj. R-Squared	.1791	.1894	.2135	.3062	.3110

Table 3 presents the estimation of Equation (1) to test whether tax receipts growth predicts future GDP growth. Estimated using OLS with a sample of quarterly observations from Q1:1988 through Q4:2019 (excluding Q4:1995 and Q4:2018). Standard errors computed using Newey and West (1987) methodology with 3 lags. ***, **, * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Predictions of GDP Growth Forecast Errors

	(1)	(2)	(3)	(4)	(5)
	$ERROR_{q+1}$				
ΔNI_q	0.090**	—	0.079*	0.077*	0.080
	(2.07)	—	(1.87)	(1.90)	(1.60)
$\Delta CORPTAXREC_q$	—	0.009***	0.009***	0.008***	0.008***
	—	(3.20)	(3.03)	(2.97)	(3.00)
$YIELD_q$	—	—	—	0.087	0.087
	—	—	—	(1.11)	(1.10)
$SPREAD_q$	—	—	—	-0.000	0.001
	—	—	—	(-0.00)	(0.01)
$RETURN_q$	—	—	—	0.035	0.034
	—	—	—	(1.35)	(1.35)
PPI_q	—	—	—	—	-0.017
	—	—	—	—	(-0.16)
GDP_q^{adv}	-0.064	-0.006	-0.039	-0.090	-0.084
	(-0.90)	(-0.11)	(-0.69)	(-1.34)	(-1.15)
Constant	0.003	0.000	0.001	-0.000	-0.001
	(0.84)	(0.01)	(0.46)	(-0.06)	(-0.10)
Observations	126	126	126	126	126
Adj. R-Squared	.0015	.0263	.0313	.0396	.0318

Table 4 presents the estimation of Equation (2) to test whether tax receipts growth predicts GDP growth forecast errors. Estimated using OLS with a sample of quarterly observations from Q1:1988 through Q4:2019 (excluding Q4:1995 and Q4:2018). Standard errors computed using Newey and West (1987) methodology with 3 lags. ***, **, * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 5
Quarterly Analysis: Predictions of GDP Growth and Forecast Errors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Q1		Q2		Q3		Q4	
	GDP_{q+1}	$ERROR_{q+1}$	GDP_{q+1}	$ERROR_{q+1}$	GDP_{q+1}	$ERROR_{q+1}$	GDP_{q+1}	$ERROR_{q+1}$
ΔNI_q	0.214***	0.141***	0.458***	0.358***	0.302	0.228	-0.055	-0.072
	(2.94)	(3.72)	(5.50)	(3.72)	(1.25)	(1.49)	(-0.56)	(-0.87)
$\Delta CORPTAXREC_q$	0.033	0.001	0.015*	0.015*	-0.030	-0.053*	0.020***	0.016***
	(1.22)	(0.07)	(1.99)	(2.01)	(-0.98)	(-2.03)	(5.39)	(5.12)
$YIELD_q$	0.127	0.040	0.037	-0.188**	0.289	0.102	0.536*	0.467*
	(0.66)	(0.40)	(0.48)	(-2.58)	(1.65)	(0.70)	(2.04)	(1.78)
$SPREAD_q$	-0.241	-0.483**	0.119	-0.195	0.004	0.008	0.289	0.279
	(-1.02)	(-2.52)	(0.55)	(-0.93)	(0.01)	(0.02)	(0.42)	(0.46)
$RETURN_q$	-0.123*	-0.082	0.094***	0.049	0.215***	0.128**	0.030	0.005
	(-1.98)	(-1.71)	(3.27)	(1.67)	(3.38)	(2.65)	(0.48)	(0.08)
PPI_q	0.057	0.049	-0.055	-0.174	-0.037	0.066	0.270	-0.001
	(0.29)	(0.36)	(-0.37)	(-1.15)	(-0.07)	(0.17)	(1.56)	(-0.00)
GDP_q^{adv}	0.040	-0.296**	0.129	-0.075	0.246	-0.179	0.425	0.032
	(0.18)	(-2.33)	(1.00)	(-0.44)	(0.77)	(-0.84)	(1.38)	(0.14)
Constant	0.060***	0.022**	0.032***	0.009	0.018	0.002	0.001	-0.023
	(6.12)	(2.51)	(4.29)	(1.05)	(0.98)	(0.16)	(0.05)	(-1.17)
Observations	32	32	32	32	32	32	30	30
Adj. R-Squared	.2109	.1050	.3635	.2204	.3699	.1296	.4914	.1358

Table 5 presents the estimations of Equations (1) and (2) on subsamples of quarterly observations to test whether the predictive ability of tax receipts growth varies among quarters. Estimated using OLS with a sample of quarterly observations from Q1:1988 through Q4:2019 (excluding Q4:1995 and Q4:2018). Standard errors computed using Newey and West (1987) methodology with 2 lags. ***, **, * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Decomposed Earnings: Predictions of GDP Growth

	(1)	(2)	(3)	(4)	(5)
			GDP_{q+1}		
$\Delta NIBSPI_q$	0.086***	—	0.081***	0.048	0.043
	(2.73)	—	(2.65)	(1.58)	(1.36)
ΔSPI_q	0.026**	—	0.024*	0.018*	0.018*
	(2.17)	—	(1.88)	(1.72)	(1.86)
$\Delta CORPTAXREC_q$	—	0.013***	0.012***	0.011***	0.011***
	—	(3.12)	(2.85)	(3.26)	(2.73)
$YIELD_q$	—	—	—	0.200*	0.207*
	—	—	—	(1.92)	(1.92)
$SPREAD_q$	—	—	—	0.161	0.133
	—	—	—	(0.74)	(0.61)
$RETURN_q$	—	—	—	0.093**	0.095**
	—	—	—	(2.13)	(2.21)
PPI_q	—	—	—	—	0.180*
	—	—	—	—	(1.77)
GDP_q^{adv}	0.426***	0.486***	0.456***	0.369***	0.288**
	(4.43)	(5.39)	(5.62)	(3.71)	(2.41)
Constant	0.026***	0.023***	0.024***	0.017**	0.020***
	(4.95)	(4.76)	(5.29)	(2.41)	(2.80)
Observations	126	126	126	126	126
Adj. R-Squared	.1845	.1894	.2183	.2944	.3051

Table 6 presents the estimation of Equation (1) with earnings decomposed into earnings before special items and special items. Estimated using OLS with a sample of quarterly observations from Q1:1988 through Q4:2019 (excluding Q4:1995 and Q4:2018). Standard errors computed using Newey and West (1987) methodology with 3 lags. ***, **, * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 7
Decomposed Earnings: GDP Forecast Errors

	(1)	(2)	(3)	(4)	(5)
	$ERROR_{q+1}$				
$\Delta NIBSPI_q$	0.050**	—	0.046**	0.035	0.035
	(2.40)	—	(2.20)	(1.55)	(1.50)
ΔSPI_q	0.012*	—	0.011	0.009	0.009
	(1.92)	—	(1.63)	(1.30)	(1.29)
$\Delta CORPTAXREC_q$	—	0.009***	0.009***	0.008***	0.008***
	—	(3.20)	(2.93)	(2.92)	(2.87)
$YIELD_q$	—	—	—	0.065	0.065
	—	—	—	(0.86)	(0.85)
$SPREAD_q$	—	—	—	0.000	-0.000
	—	—	—	(0.00)	(-0.00)
$RETURN_q$	—	—	—	0.034	0.034
	—	—	—	(1.24)	(1.25)
PPI_q	—	—	—	—	0.002
	—	—	—	—	(0.02)
GDP_q^{adv}	-0.041	-0.006	-0.019	-0.056	-0.057
	(-0.62)	(-0.11)	(-0.36)	(-0.94)	(-0.76)
Constant	0.002	0.000	0.000	-0.001	-0.001
	(0.52)	(0.01)	(0.08)	(-0.20)	(-0.19)
Observations	126	126	126	126	126
Adj. R-Squared	.0040	.0263	.0329	.0332	.0249

Table 7 presents the estimation of Equation (2) with earnings decomposed into earnings before special items and special items. Estimated using OLS with a sample of quarterly observations from Q1:1988 through Q4:2019 (excluding Q4:1995 and Q4:2018). Standard errors computed using Newey and West (1987) methodology with 3 lags. ***, **, * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 8
Predictions of GDP Growth with Individual Tax and Employment Tax Receipts

	(1)	(2)	(3)	(4)	(5)	(6)
	GDP_{q+1}					
ΔNI_q	0.138*	0.124*	0.134*	0.122*	0.141*	0.132*
	(1.89)	(1.71)	(1.77)	(1.66)	(1.85)	(1.78)
$\Delta CORPTAXREC_q$	—	0.011***	—	0.017***	—	0.011***
	—	(3.04)	—	(5.29)	—	(2.96)
$\Delta INDIV\_WH_q$	-0.006	0.002	—	—	—	—
	(-0.44)	(0.15)	—	—	—	—
$\Delta INDIV\_EST_q$	—	—	-0.000	0.004**	—	—
	—	—	(-0.27)	(1.98)	—	—
$\Delta EMPLOY\_TAX_q$	—	—	—	—	0.014	0.015
	—	—	—	—	(1.20)	(1.24)
$YIELD_q$	0.253**	0.241**	0.251**	0.244**	0.247**	0.234**
	(2.15)	(2.12)	(2.12)	(2.17)	(2.10)	(2.08)
$SPREAD_q$	0.151	0.130	0.151	0.132	0.146	0.122
	(0.68)	(0.60)	(0.68)	(0.62)	(0.67)	(0.57)
$RETURN_q$	0.097**	0.094**	0.097**	0.087**	0.093**	0.090**
	(2.49)	(2.40)	(2.47)	(2.27)	(2.48)	(2.45)
PPI_q	0.162	0.151	0.168	0.158	0.152	0.129
	(1.45)	(1.32)	(1.53)	(1.43)	(1.39)	(1.17)
GDP_q^{adv}	0.210	0.250**	0.213	0.249**	0.214*	0.255**
	(1.63)	(2.09)	(1.65)	(2.10)	(1.68)	(2.15)
Constant	0.022***	0.020***	0.022***	0.019***	0.022***	0.020***
	(3.30)	(3.05)	(3.29)	(2.83)	(3.26)	(3.05)
Observations	126	126	126	126	126	126
Adj. R-Squared	0.2799	0.3052	0.2794	0.3199	0.2867	0.3138

Table 8 presents the estimation of Equation (1) that incorporates changes in corporate tax receipts with changes in tax receipts from individual income tax related to wages (*ΔINDIV_WH*), changes in tax receipts from individual income tax related to and business or other income (*ΔINDIV_EST*), and changes in employment tax receipts (*ΔEMPLOY_TAX*) to test whether additional sources of tax receipts growth predict future GDP growth. Columns (1), (3), and (5) report estimations that test the individual information content of each additional revenue source, while Columns (2), (4), and (6) report estimations that test whether additional sources are incremental to corporate tax receipts. Estimated using OLS with a sample of quarterly observations from Q1:1988 through Q4:2019 (excluding Q4:1995 and Q4:2018). Standard errors computed using Newey and West (1987) methodology with 3 lags. ***, **, * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.