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MEASURING THE ECONOMIC IMPACT OF DB PENSION EXPENDITURES

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EXECUTIVE SUMMARY

Defined benefit (DB) pension benefits not only provide a secure source of income for many retired Americans, they also contribute substantially to local, state, and national economies. DB pensions play a vital role in sustaining consumer demand that ultimately supports millions of jobs.

Virtually every state and local economy across the country benefits from the spending of pension checks. For example, when a retired nurse residing in the state of Wisconsin receives a pension benefit payment, s/he spends the pension check on goods and services in the local community. S/he purchases food, clothing, and medicine at local stores, and may even make larger purchases like a car or laptop computer. These purchases, combined with those of other retirees with pensions, create a steady economic ripple effect. In short, pension spending supports the economy and supports jobs where retirees reside and spend their benefits. Pension expenditures may be especially vital to small or rural communities, where other steady sources of income may not be readily found if the local economy lacks diversity.

Additionally, reliable pension income can be especially important not only in providing retirees with peace of mind, but in stabilizing local economies during economic downturns. Retirees with DB pensions know they are receiving a steady check despite economic conditions. In contrast, retirees may be reluctant to spend out of their 401(k)-type accounts if their savings are negatively impacted by market downturns.[1] To the extent that DB pensions provide retirees with steady income available for spending regardless of fluctuations in the stock market, DB pensions may play a stabilizing role in the economy like Social Security.[2]

This study analyzes data on DB pension plans in both the public and private sectors to assess the overall national economic impact of benefits paid by these plans to retirees. For state and local government pension plans, we also analyze these impacts at the state level for each of the 50 states and the District of Columbia. Because of methodological refinements, explained in the Technical Appendix, the state level results are not directly comparable to those in previous versions of this study.

The economic gains attributable to DB pension expenditures are considerable. This study finds that, in 2018:

$578.7 billion in pension benefits were paid to 23.8 million retired Americans, including:

- $308.7 billion paid to some 11.0 million retired employees of state and local government and their beneficiaries (typically surviving spouses);
- $105.9 billion paid to some 2.6 million federal government beneficiaries;
- $164.1 billion paid to some 10.1 million private sector beneficiaries, including:
  - $44.2 billion paid out to 3.8 million beneficiaries of multi-employer pension plans, and
  - $119.9 billion paid out to 6.3 million beneficiaries of single-employer pension plans.

Expenditures made out of those payments collectively supported:

- 6.9 million American jobs that paid nearly $394.2 billion in labor income;
- $1.3 trillion in total economic output nationwide;
- $703.9 billion in value added (GDP); and
- $191.9 billion in federal, state, and local tax revenue.

DB pension expenditures have large multiplier effects:

- Each dollar paid out in pension benefits supported $2.19 in total economic output nationally.
- Each taxpayer dollar contributed to state and local pensions supported $8.80 in total output nationally. This represents the leverage afforded by robust long-term investment returns and shared funding responsibility by employers and employees.

The largest employment impacts occurred in the real estate, food services, healthcare, and retail trade sectors.

INTRODUCTION: MEASURING THE ECONOMIC IMPACT OF DB PENSIONS

Virtually every state and local economy across the country benefits from the spending of defined benefit (DB) pension payments. For example, when a retired nurse residing in the state of Wisconsin receives a pension benefit payment, s/he spends the pension check on goods and services in the local community. S/he purchases food, clothing, and medicine at local stores, and may even make larger purchases like a car or laptop computer. These purchases, combined with those of other retirees with pensions, create an economic ripple effect. In short, pension spending supports the economy and supports jobs where retirees reside and spend their benefits. Pension expenditures may be especially vital to small or rural communities, where other steady sources of income may not be readily found if the local economy lacks diversity.

Additionally, reliable pension income can be especially important not only providing retirees with peace of mind, but in stabilizing local economies during economic downturns. Retirees with DB pensions know they are receiving a steady check despite economic conditions. In contrast, retirees may be reluctant to spend out of their 401(k)-type accounts if their savings are negatively impacted by market downturns. To the extent that DB pensions provide retirees with steady income available for spending regardless of fluctuations in the stock market, DB pensions may play a stabilizing role in the economy like Social Security.[3]

The purpose of this study is to quantify the economic impact of DB pension payments in the U.S. and in each of the 50 states and the District of Columbia (hereafter referred to as "states"). Using the IMPLAN model, we estimate the employment, output, value added, and tax impacts of pension benefit expenditures at the national and state levels.

The remainder of this introduction provides a brief background on DB pensions and an overview of the methodology. Section I outlines the major types of economic impacts measured in this study. Section II presents national level findings. Section III outlines the state level impact analysis, and Section IV presents the state level findings.

Background: DB Pensions In the United States

Defined benefit (DB) pension plans have existed in the United States since the 19th century. In the private sector, the first DB pension plan was introduced in 1875 by the American Express Company.[4] Over time, many private sector employers saw the value of offering DB pension coverage to their employees, as these benefits not only were quite valued by workers, but from a human resource management perspective, they also acted as an effective recruitment and retention tool.[5] Although private sector DB plans have experienced a decline in recent decades (due in large part to a difficult regulatory environment),[6] in 2018, 16 percent of full-time private sector employees had access to DB pension coverage.[7]

In the public sector, Congress created the Civil Service Retirement System (CSRS) to provide a pension for civilian federal employees in 1920. In 1986, Congress implemented the new Federal Employee Retirement System (FERS), which includes Social Security, a DB annuity, and a 401(k)-type savings plan, called the Thrift Savings Plan.[8] While many major municipalities offered pensions to police and firefighters and 21 states had pensions plans covering teachers by the 1920s,[9] state and local pension systems began to take root on a large scale during the Great Depression. When Social Security was established in 1935, the system left out state and local workers, and many states acted to develop their own retirement systems for their employees. Between 1931 and 1950, nearly half of the large public employee pension plans existing today were established; 45 states had retirement systems in place by 1961.[10]

In 2018, state and local pension plans in the United States collectively held total assets of $4.3 trillion. They served 32.1 million Americans, including 14.6 million active participants, 6.5 million inactive members, and 11.0 million retirees and other beneficiaries receiving regular benefit payments. Benefit payments in 2018 totaled $308.7 billion, for an average benefit payment of $2,335 per month, or $28,019 per year.[11]

Federal pension plans currently serve 2.7 million active civilian employees.[12] In 2016, Federal plans paid out some $105.9 billion in pension benefits to 2.6 million retirees and beneficiaries, for an average benefit of $3,334 per month, or $40,003 per year.[13]

Private sector pension plans covered 37 million Americans,[14] including 10.1 million retired Americans and other beneficiaries in 2018.[15] With total plan assets of $3.2 trillion in 2018,[16] private DB pensions paid out some $164.1 billion in pension benefits to retirees and beneficiaries.[17] The average private sector pension benefit was $1,351 per month, or $16,206 per year.

There are two major types of private sector pension plans: multiemployer plans and single employer plans. Single employer plans generally cover a single workforce at a single company. Multiemployer plans, also called "Taft-Hartley" plans, cover multiple employers, usually within the same industry and/or geographic region. They are jointly governed by management and the labor union(s) representing the participating workers.

In 2018, single employer plans provided some $119.9 billion in benefits to 6.3 million retirees, for an average benefit of roughly $19,045 per year, or $1,587 per month. Multiemployer plans cover fewer workers, and tend to have less generous benefits. In 2018, some 3.8 million beneficiaries received benefits totaling $44.2 billion, for an average benefit of $11,540 per year, or $962 per month.[18] (See **Table 1**.)

DB plans are prefunded systems, which means that a retirement fund receives regular contributions for each employee during the course of that person's career. This type of arrangement can be contrasted with "pay-as-you-go" systems like Social Security, whereby contributions of current employees are used to pay benefits for current retirees. Prefunded retirement systems have the advantage that investment earnings can do much of the work of paying for benefits. In such a system, the contributions made on behalf of current employees are invested, and these investment earnings compound over time. Over a span of decades, accumulation of investment earnings can be substantial, and in many cases pay the majority of the pension benefits.

In state and local government pension plans, typically both the employee and employer make contributions to the pension fund. Pension fund trustees have a fiduciary duty to ensure that the retirement fund is operating in the best interest of workers and retirees, and hire professional managers to oversee fund investments.[19] In this respect, public plans differ from private sector DB plans, which are generally funded solely by employers. In requiring that employees share the cost of their pension public plans are similar to the approach adopted in 401(k) plans where private sector employees contribute to their accounts.

However, DB pensions are distinguishable from defined contribution (DC) plans, such as 401(k) plans, in that they provide broad-based coverage, secure money for retirement, a lifetime income, and special protections for spouses.[20] Research shows that DB plans are more economically efficient than DC plans. Pensions can deliver the same level of retirement benefits at nearly half the cost of a DC plan.[21]

State and local pension fund receipts come from three sources: employer contributions, employee contributions, and earnings on investments. **Figure 1** shows that between 1993 and 2018, 24.86% of public pension fund receipts came from employer contributions, 11.08% from employee contributions, and 64.07% from investment earnings. Earnings on investments—not taxpayer contributions—have historically made up the bulk of pension fund receipts, even though this time period saw two very large market downturns within a single decade. It should be noted that public pension reform in nearly every state since 2008 has relied heavily on increased employee contributions as a way to immediately reduce taxpayer costs.[22]

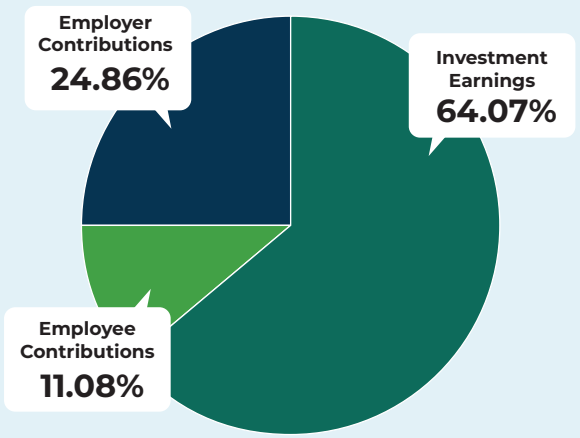
Just as contributions from employees and employers have an expanded impact through the compounding of

Table 1: Public and Private Sector Pension Benefits, 2018

	State and Local	Federal	Private Sector		Total*
			Single Employer Plans	Multiemployer Plans	
Beneficiaries	11.0 million	2.6 million	6.3 million	3.8 million	**23.8 millon**
Average Benefit	$28,019	$40,003	$19,045	$11,540	**$24,325**
Total Benefits	**$308.7 billion**	**$105.9 billion**	**$119.9 billion**	**$44.2 billion**	**$578.7 billion**

Note: Author's analysis of the Annual Survey of Public Pensions, Congressional Research Service, Pension Benefit Guaranty Corporation, and IRS Form 5500 data.
*Totals may not add up exactly due to rounding.
**Total average benefit represents a weighted average of public and private sector benefits.

Figure 1: Aggregate State and Local Pension Contributions by Source, 1993-2018



Note: Author's analysis of data from the U.S. Census Bureau.

investment earnings over time, a similar dynamic occurs when retirees spend their pension checks. When a retiree receives a pension benefit, s/he spends it on goods and services in the local community. These expenditures have a "ripple effect" in the economy, as one person's expenditures become another person's income.

Measuring the National Economic Impact of DB Pension Plans

This study measures the economic impact of pension benefits paid by public and private pension plans nationally, as well as the economic effects of state and local plans within each state economy. Our analysis rests on the recognition that expenditures have a "multiplier" effect in a regional or national economy. When money is spent at a local business to purchase, say, groceries, that initial purchase generates even more income. First, some of the money spent circulates back to the businesses that manufactured, transported, and otherwise contributed to the production of those goods. Second, the proprietors of these businesses and their employees will spend more money at other businesses, spurring another round of income generation. Thus, with each new round of spending, additional revenue is generated, sustaining jobs, incomes, total output, and tax revenue to the local community.

In addition, local economies benefit not only from pension spending by residents, but from pension checks spent in other localities. That is, the economic benefits generated by pension spending in one region "leak" to and are captured by other regions.

Our analysis is focused on the expenditure effects of pension benefits, measuring the economic impacts that result when expenditures made by retirees ripple throughout the economy. Because pension benefits are permanent sources of income—in that they cannot be outlived—we would expect the economic impacts to be larger than those of temporary income increases.[23] For this reason, we would expect the economic impacts of pension benefit expenditures to be larger than those out of, for example, unemployment insurance benefit payments. It should also be noted that this study measures the gross economic impacts of pension benefit expenditures, rather than the net economic impacts. For a detailed explanation, see the Technical Appendix.

Because taxpayers and elected officials have an interest in gauging the ultimate economic impact of each tax dollar "invested" in a state or local pension plan, we calculate a proxy measurement of the total economic impact attributable to each dollar in pension contributions made by the taxpayer, called the "taxpayer investment factor." Details follow.

Data and Methodology

The data used for our analysis comes primarily from two sources: the U.S. Census Bureau and IMPLAN. We used data for 2018, as it was the most recently available at the time of our analysis.

Data on state and local pension plans comes from the Census Bureau's Annual Survey of Public Pensions, which is a representative sample of state and local DB pension plans in the United States.[24] This survey provides data on revenues, expenditures, financial assets, and membership for state and local pension plans on a national basis and in each of the states. Federal pension data comes from the Congressional Research Service.[25] Data on private pension benefits comes from the Census Bureau and Bureau of Labor Statistics' Current Population Survey Annual Social and Economic Supplement (CPS ASEC), which reports sources of household income, including pension and survivor income, by age.[26]

To measure the economic impacts of retiree expenditures made out of benefits paid by DB pension plans, the input-output modeling software, IMPLAN, was used. IMPLAN was first developed in the 1970s as part of a USDA Forest Service project to analyze the economic effects of local land management projects such as timber, mining, and recreation activities.[27] Since that time, IMPLAN has been

used by industry and government analysts throughout the country to assess economic impacts of highly varied local community development projects. These studies include many recent economic impact studies of pension benefit payments from state retirement systems.[28]

Between the time NIRS' original Pensionomics study was published in 2009[29] and the release of this report,[30] IMPLAN underwent significant modeling changes. Due to these changes, results of the current study are not directly comparable to those of 2009 study, and the reader should avoid drawing conclusions based on such comparisons. In addition, improvements in technical capacity allowed the author to run IMPLAN for the state level analysis in a manner that allowed us to capture significantly more of the inter-state economic flows compared to the 2009 study. In relation to Pensionomics 2018, 2016, 2014, and 2012, the fundamental modeling structure remains the same; however, the results may not be comparable for other reasons. For example, in its newest data releases, IMPLAN changed the household income ranges that it uses to model household expenditure patterns. Due to this change, along with fundamental changes to the US economy that occur each year, as well as using a new household income bracket within IMPLAN, the reported national multiplier has increased since the last study, while multipliers at the state level are varied. Detailed information on our data and methodology and further discussion of these differences appear in the Technical Appendix.

The Multiplier Effect: How Spending Ripples Through the Economy, Supporting Jobs and Incomes in the Process

PENSION BENEFIT

DIRECT IMPACT

INDIRECT IMPACT

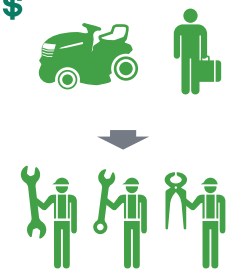
INDUCED IMPACT

A retired firefighter...

$

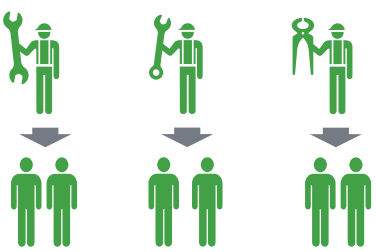
...uses his pension money to buy a new lawnmower.

$ $



As a result of that purchase, the owner of the hardware store, the lawnmower salesman, and each of the companies involved in the production of the car **all see an increase in income, and spend that additional income.**

$ $ $



These companies hire additional employees as a result of this increased business, **and those new employees spend their paychecks in the local economy.**

I. ECONOMIC IMPACT MEASUREMENTS

We analyze the economic impact of expenditures made by retirees out of their DB pension payments along four dimensions: employment and labor income, output, value added, and tax revenues. Each of these is described in detail below.

1. Employment and Labor Income Impact: When retirees spend their pension checks, their expenditures help to support jobs—at the local diner, hospital, or even at a factory somewhere across the country. When a retiree makes a purchase, the money spent translates into business revenues, jobs, and income. Using IMPLAN, we calculated the number of jobs supported by retirees' expenditures. These are broken down among direct, indirect, and induced employment impacts. The direct employment impact occurs when the initial benefit payment is spent by the retiree. The indirect impact occurs as money flows back to businesses that supply goods and services to merchants receiving direct expenditures from retirees. The induced employment impact is attributable to the additional income generated through the purchase of goods and services by workers hired as a result of the direct and indirect impacts. In all cases, the employment impact constitutes an estimate of "annual average jobs" within a single year. We also present estimates of labor income supported by pension expenditures, which is a component of value added, as described below.

2. Output Impact: Total output includes the value of all goods and services produced in the economy. Using IMPLAN, we calculate the value of total output supported by retirees' expenditures of DB pension benefits. As with the employment effects, we present estimates of the impact on total output, broken down by direct, indirect, and induced impacts. The direct impact consists of the initial round of spending. Indirect impacts consist of the rounds of spending by the local merchants. Induced impacts are the additional outputs created when workers, whose jobs are supported by the direct and indirect spending rounds, spend their paychecks in the local economy.

We also calculate a pension expenditure multiplier and taxpayer investment factor. The pension expenditure multiplier tells us the total economic impact attributable to each dollar in pension benefits paid to a retiree. (For example, a multiplier of 2.19 means that every $1 paid to retirees in a local economy supports $2.19 of total output in that region.) We calculate the pension expenditure multiplier by dividing the total output (consisting of the direct, indirect, and induced impacts taken together) by the value of the "initial event" in the economy (in this case, the gross pension benefit). Expenditure multipliers usually lie between 1.0 and 3.0.

3. Value Added Impact: Value added is a net estimate of the creation of "new value" in the economy. Commonly referred to as Gross Domestic Product (GDP), it includes the value of employee compensation, profits, rents, and other aspects of production, but excludes the costs of purchased materials and services. IMPLAN calculates the value added attributable to DB pension benefit expenditures.

4. Tax Impact: Economic activity of all kinds—receiving pension income, earning wages, producing profits, selling goods and services—provides the basis for the tax revenues that are required to fund government services. To calculate the impact that pension payments have on tax revenues, we first calculate the taxes paid by beneficiaries directly on their pension benefits. Then, using IMPLAN, we calculate estimates of taxes attributable to the economic activity that results when retirees spend their after-tax pension checks, and in all subsequent rounds of spending. This includes all corporate, property, and business taxes that are generated through each spending round.

II. RESULTS: NATIONAL ECONOMIC IMPACT OF DB PENSION PLANS

Our analysis indicates that DB pension benefits not only provide a secure source of income for many retired Americans, they also contribute substantially to the national economy. DB pensions play a vital role in sustaining consumer demand that, in turn, ultimately supports millions of jobs, and hundreds of billions of dollars in income, output, value added, and tax revenues.

Employment and Income

Our analysis shows that the $578.7 billion in gross public and private pension benefits paid out in 2018 supported 6.9 million American jobs, as shown in **Table 2**. Of these jobs, 3.7 million were supported by state and local pension benefit expenditures, and 1.3 million by Federal pension expenditures. In the private sector, single employer plans supported 1.4 million jobs, and multiemployer plans supported an additional half a million jobs. All told, 3.0 million jobs were attributable to direct impacts (direct spending by retirees), 1.6 million to indirect impacts (spending by merchants on businesses further up the supply chain), and 2.2 million through induced impacts (additional jobs supported when employees whose jobs are tied to direct and indirect spending rounds spend their paychecks). These jobs collectively paid out an estimated $394.2 billion in labor income, as shown in in **Table 3**.

To put these employment impacts in perspective, the 6.9 million jobs supported by pensioners' expenditures exceed the number of jobs in the entire wholesale trade industry (5.9 million jobs in 2018).[31]

Table 2: DB Pensions Support 6.9 Million American Jobs

	State & Local Pensions (# Jobs)	Federal Pensions (# Jobs)	Private Pensions		Total Jobs Supported* (# Jobs)
			Single Employer (# Jobs)	Multiemployer (# Jobs)	
Direct Impact	1,595,913	547,389	619,753	228,494	**2,991,550**
Indirect Impact	870,460	298,563	338,033	124,627	**1,631,683**
Induced Impact	1,191,784	408,775	462,815	170,633	**2,234,006**
Total Employment Impact	**3,658,158**	**1,254,727**	**1,420,601**	**523,754**	**6,857,240**

*Totals may not add up exactly due to rounding.

In addition, in 2018 the national unemployment rate was 3.9 percent. The entire civilian labor force in the country consisted of 162.1 million potential workers, of whom 6.3 million were unemployed.[32] In light of these numbers, the fact that DB pension expenditures supported 6.9 million jobs is significant, as it represents a full 4.3 percentage points in the national labor force.

Total Output

Our model further finds that the $578.7 billion in public and private pension benefit payments in 2018 supported nearly $1.3 trillion dollars in overall economic output in the national economy. This consisted of $510.0 billion in direct impacts, $354.6 billion in indirect impacts, and $400.5 billion in induced impacts. In terms of benefit source, $674.9 billion in economic activity stemmed from state and local pension benefit expenditures, $231.5 billion from Federal pension expenditures, $262.1 billion from single employer pensions, and $96.6 billion from multiemployer plans. See **Table 4**.

This $1.3 trillion dollars in overall economic output is more than the total output contributed by the entire accommodation and food services industry, which generated $1.1 trillion in total output in the national economy in 2018.[33]

Value Added (GDP)

Retirees' expenditures of DB pension benefit payments supported $703.9 billion in value added to the national economy in 2018, including $375.5 billion supported by

Table 3: DB Pensions Support $394.2 Billion in Labor Income

	State & Local Pensions	Federal Pensions	Private Pensions		Total Labor Income Supported*
			Single Employer	Multiemployer	
Direct Impact	$83.8 billion	$28.7 billion	$32.5 billion	$12.0 billion	**$157.1 billion**
Indirect Impact	$59.0 billion	$20.2 billion	$22.9 billion	$8.4 billion	**$110.6 billion**
Induced Impact	$67.5 billion	$23.2 billion	$26.2 billion	$9.7 billion	**$126.5 billion**
Total Labor Income Impact	**$210.3 billion**	**$72.1 billion**	**$81.7 billion**	**$30.1 billion**	**$394.2 billion**

*Totals may not add up exactly due to rounding.

state and local pension benefits, $128.8 billion by Federal pension benefits, $145.8 billion by single employer pensions, and $53.8 billion by multiemployer pensions. See **Table 5**.

This $703.9 billion in value added is substantially more than what was contributed by the entire transportation and warehousing industry, which generated $648.0 billion in value added in 2018.[34]

Tax Revenue

Our analysis finds that an estimated $191.9 billion in total tax revenue was attributable to public and private pension benefits in 2018, including $102.0 billion in federal tax revenue and $89.8 billion in state and local tax revenue. (**See Tables 6 and 7**.)

Tax revenue comes from two major sources: taxes paid by beneficiaries directly on their pension benefits and taxes resulting from expenditures made in the local economy (for example, sales taxes resulting from a retail purchase). Of the total tax revenue supported, $41.5 billion came from income taxes paid by beneficiaries on their benefits and $150.4 billion from taxes resulting from the spending of net pension benefits.

To put these numbers in perspective, the total federal tax revenue attributable to public pension benefit payments is more than the $95.5 billion the federal government spent on all education, training, employment, and social services in 2018.[35] The total state and local tax revenue supported is roughly equivalent to what state and local governments collectively spent on hospitals in 2018.[36]

Economic Impacts by Industry

Table 8 breaks down the economic effects of public and private pension expenditures by the top ten industry sectors affected. Nationally, the largest employment impacts were seen in the real estate, food service, healthcare, and wholesale and retail trade sectors. In 2018, pension expenditures supported 311,263 jobs in the real estate industry, 533,213 jobs in full- and limited-service restaurants, and 608,507 jobs in the healthcare industry (including nursing and community care facilities, hospitals, and offices of physicians).

Table 4: DB Pensions Support $1.27 Trillion in Total Economic Activity

	State and Local Pensions	Federal Pensions	Private Pensions		Total Output Supported*
			Single Employer	Multiemployer	
Direct Impact	$272.1 billion	$93.3 billion	$105.7 billion	$39.0 billion	$510.0 billion
Indirect Impact	$189.2 billion	$64.9 billion	$73.5 billion	$27.1 billion	$354.6 billion
Induced Impact	$213.6 billion	$73.3 billion	$83.0 billion	$30.6 billion	$400.5 billion
Total Output Impact	**$674.9 billion**	**$231.5 billion**	**$262.1 billion**	**$96.6 billion**	**$1.27 trillion**

*Totals may not add up exactly due to rounding.

Table 5: DB Pensions Support $703.9 Billion in Value Added (GDP)

	State and Local Pensions	Federal Pensions	Private Pensions		Value Added Supported*
			Single Employer	Multiemployer	
Direct Impact	$160.9 billion	$55.2 billion	$62.5 billion	$23.0 billion	$301.6 billion
Indirect Impact	$95.4 billion	$32.7 billion	$37.1 billion	$13.7 billion	$178.9 billion
Induced Impact	$119.2 billion	$40.9 billion	$46.3 billion	$17.1 billion	$223.5 billion
Total Value Added Impact	**$375.5 billion**	**$128.8 billion**	**$145.8 billion**	**$53.8 billion**	**$703.9 billion**

*Totals may not add up exactly due to rounding.

Table 6: DB Pensions Support $102.0 Billion in Federal Tax Revenue

	State and Local Pensions	Federal Pensions	Private Pensions		Total Federal Tax Revenue*
			Single Employer	Multiemployer	
Taxes Paid by Beneficiaries on Benefits	$9.6 billion	$3.3 billion	$3.7 billion	$1.4 billion	$17.9 billion
Tax Revenue Resulting from Retiree Expenditures	$44.9 billion	$15.4 billion	$17.4 billion	$6.4 billion	$84.1 billion
Total Federal Tax Revenue Impact	**$54.4 billion**	**$18.7 billion**	**$21.1 billion**	**$7.8 billion**	**$102.0 billion**

*Totals may not add up exactly due to rounding.

Table 7: DB Pensions Support $89.8 Billion in State and Local Tax Revenue

	State and Local Pensions	Federal Pensions	Private Pensions		Total State and Local Tax Revenue*
			Single Employer	Multiemployer	
Taxes Paid by Beneficiaries on Benefits	$12.6 billion	$4.3 billion	$4.9 billion	$1.8 billion	$23.6 billion
Tax Revenue Resulting from Retiree Expenditures	$35.4 billion	$12.1 billion	$13.7 billion	$5.1 billion	$66.3 billion
Total State and Local Tax Revenue Impact	**$47.9 billion**	**$16.4 billion**	**$18.6 billion**	**$6.9 billion**	**$89.8 billion**

*Totals may not add up exactly due to rounding.

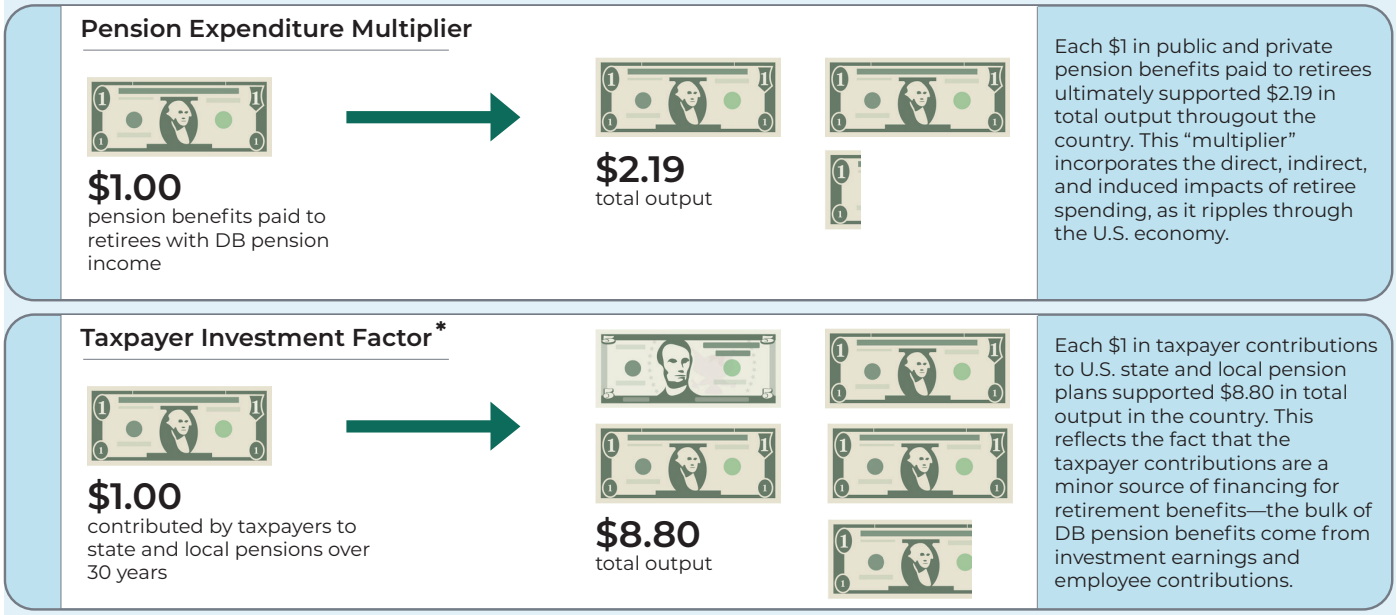
Table 8: Top Ten Industries by National Employment Impact

	Total # Jobs Supported				
Industry	From State and Local Pensions	From Federal Pensions	From Single Employer Pensions	From Multiemployer Pensions	**Total**
Real estate	166,051	56,954	64,484	23,774	**311,263**
Full-service restaurants	160,221	54,955	62,220	22,940	**300,335**
Nursing and community care facilities	152,394	52,270	59,180	21,819	**285,664**
Limited-service restaurants	124,234	42,612	48,245	17,787	**232,878**
Hospitals	102,248	35,070	39,707	14,639	**191,664**
Wholesale trade	85,354	29,276	33,146	12,220	**159,996**
Retail - General merchandise stores	82,431	28,273	32,011	11,802	**154,517**
Retail - Food and beverage stores	81,283	27,880	31,565	11,638	**152,366**
Individual and family services	71,375	24,481	27,718	10,219	**133,793**
Offices of physicians	69,980	24,003	27,176	10,019	**131,179**

Figure 2: Economic Multipliers

The pension expenditure multiplier for 2018 in the U.S was 2.19, meaning every dollar paid out in DB pension benefits in that year generated $2.19 of total output in the national economy.

Because DB pension plans are prefunded, only a small portion of the total pension payment in any given year is funded through employer or taxpayer dollars, as discussed previously. Therefore, for state and local plans, it may be helpful to calculate the total impact of state and local pension benefit expenditures that is attributable to the "taxpayer investment" in these plans. Because only 24.86 cents of every dollar paid out in pension benefits in 2018 was generated through taxpayer contributions (see **Figure 1**), the taxpayer investment factor is substantially higher than the expenditure multiplier. In 2018, of the $308.7 billion paid out in state and local pension benefits, only $76.74 billion was funded by taxpayer dollars. The total economic impact attributable to state and local pension benefits was $674.9 billion. The taxpayer investment factor, then, was 8.80. That is, every taxpayer dollar contributed to state and local pension plans supported $8.80 in national economic output.



*Caution should be used in interpreting this number. See the Technical Appendix for details.

III. MEASURING STATE-LEVEL ECONOMIC IMPACTS OF STATE AND LOCAL PENSION BENEFITS

Next, we consider the specific economic impacts of state and local pension benefit expenditures within each state, accounting for cross-state economic impacts and migration.

Federal and private pension plans are not included in the analysis because of data limitations.

The economic impacts and multipliers for individual states are collectively smaller than the national impacts and multipliers, because state economies are smaller and less diverse than the national economy as a whole.

The smaller and more homogeneous a local economy is, the smaller the economic multipliers will tend to be for that economy. This is because economic impact analysis, based on local production and purchasing patterns, accounts for economic benefits that leave the state. The economic benefit "lost" to other states or countries is called leakage.

However, because we are interested in assessing the economic impacts of state and local pension benefits nationally, i.e., across all states, we employ an approach that accounts for the fact that one state's "loss" is often another state's "gain." We account for a significant share of the leakage caused by interstate commerce by utilizing a Multi-Regional Input-Output (MRIO) analysis for each of the fifty states and the District of Columbia.

For example, if a consumer in the state of Alabama purchases a new lawnmower, that purchase is broken down into its various components of production: the engineers and designers, the parts manufacturers, and the retail salesperson all receive a portion of the revenue from that sale. Because the lawnmower was purchased within Alabama, the portion of output due the retailer will certainly be added to Alabama's total output. If the lawnmower was designed in Michigan and manufactured in Ohio, however, output from these services would not be included in Alabama's total output, because they were not performed within the state of Alabama, but in those of Michigan and Ohio, respectively.

Because most individual state economies are not as diverse as the U.S. economy as a whole, the state-level multipliers resulting from this analysis—focused on measuring economic benefits at the state rather than national level—will be smaller than the national multipliers. However, whenever all of the services in any single transaction are performed by firms and workers in the U.S., they are accounted for in the national economic impacts.

In addition, we also adjust for net flows of retirees and their pension payments across state borders, drawing on Census data on migration patterns of older households. Retirees who live and therefore spend their income outside of their state of origin contribute to economic activity in their new state of residence.

Thus, each state's total economic impacts consist of net in-state impacts (attributable to pension payment expenditures originating in the state) and net out-of-state impacts (attributable to pension expenditures originating from any of the other states). For more information, see the Technical Appendix.

IV. RESULTS: STATE-LEVEL IMPACT OF DB PENSION PLANS

While our model does not fully capture all of the state-level economic impact, the results show that every state gained substantial economic benefit from state and local DB pension payments.

The following series of charts and tables provide the key state-level results of the economic impact analysis. Not surprisingly, the state of California—with the largest economy of the 50 states—showed the largest employment, output, and value added impacts: 395,520 jobs, $73.7 billion in output, and $47.3 billion in value added supported by state and local pension benefit expenditures. But even in smaller states, the impacts of state and local pension benefits are substantial.

Figures 4 and 5 present the pension expenditure multipliers and taxpayer investment factors for each state. Pension expenditure multipliers vary somewhat by state, but generally speaking, larger states and those with more diverse economic bases will have larger multipliers than smaller states and those with a more homogeneous economic base. These multipliers account for the impact of pension expenditures originating both from within the state and those pension dollars that originate from another state but are spent within the state in question.

In 2018, the average state-level pension expenditure multiplier was 1.48, meaning that for every dollar paid out in pension benefits received by a state resident, $1.48 in total output was supported within that state.[37]

As is the case at the national level, the taxpayer investment factors for each state are much larger than the pension expenditure multipliers.

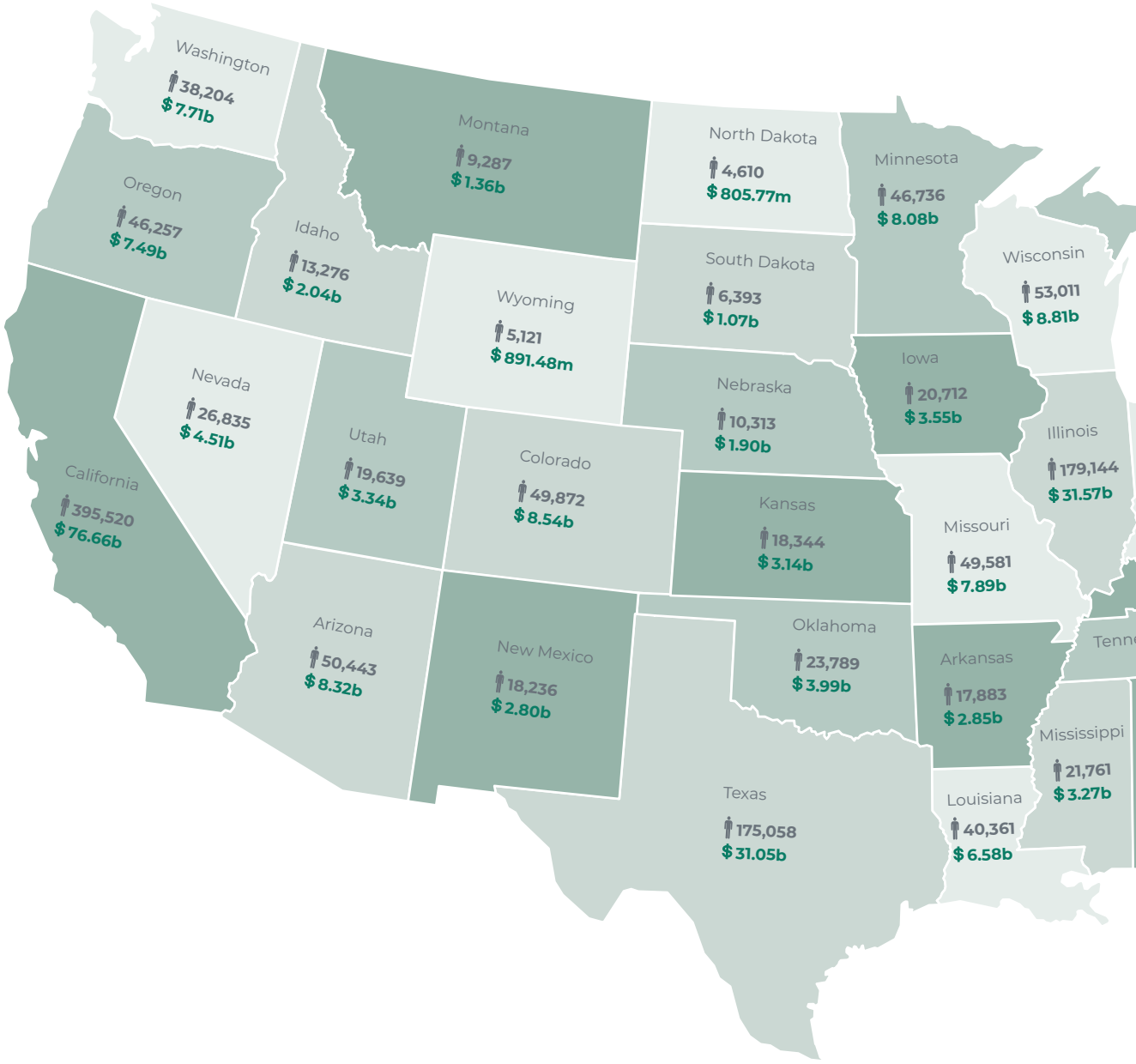
Because state and local pension plans are prefunded, only a small portion of the total pension payment in any given year is funded through taxpayer dollars. The total impact of state and local pension benefit expenditures that is attributable to the "taxpayer investment" in these plans is shown in **Figure 5**. In 2018, the average taxpayer investment factor was 6.23, meaning that for every dollar contributed by taxpayers in a single state, $6.23 in total economic output was supported within that state, on average.

Note that caution should be used in interpreting the taxpayer investment factor for some states. See the Technical Appendix for details.

Table 9: Employment Impacts by State

	# Jobs		# Jobs
Alabama	30,054	Montana	9,287
Alaska	8,778	Nebraska	10,313
Arizona	50,443	Nevada	26,835
Arkansas	17,883	New Hampshire	8,495
California	395,520	New Jersey	86,604
Colorado	49,872	New Mexico	18,236
Connecticut	38,795	New York	247,876
Delaware	8,940	North Carolina	57,672
DC	4,559	North Dakota	4,610
Florida	123,246	Ohio	141,130
Georgia	76,934	Oklahoma	23,789
Hawaii	13,028	Oregon	46,257
Idaho	13,276	Pennsylvania	112,922
Illinois	179,144	Rhode Island	10,377
Indiana	30,274	South Carolina	35,307
Iowa	20,712	South Dakota	6,393
Kansas	18,344	Tennessee	37,152
Kentucky	36,959	Texas	175,058
Louisiana	40,361	Utah	19,639
Maine	10,128	Vermont	4,280
Maryland	43,006	Virginia	50,339
Massachusetts	62,533	Washington	38,204
Michigan	81,593	West Virginia	10,884
Minnesota	46,736	Wisconsin	53,011
Mississippi	21,761	Wyoming	5,121
Missouri	49,581		

Figure 3: Employment and Economic Output Impacts by State



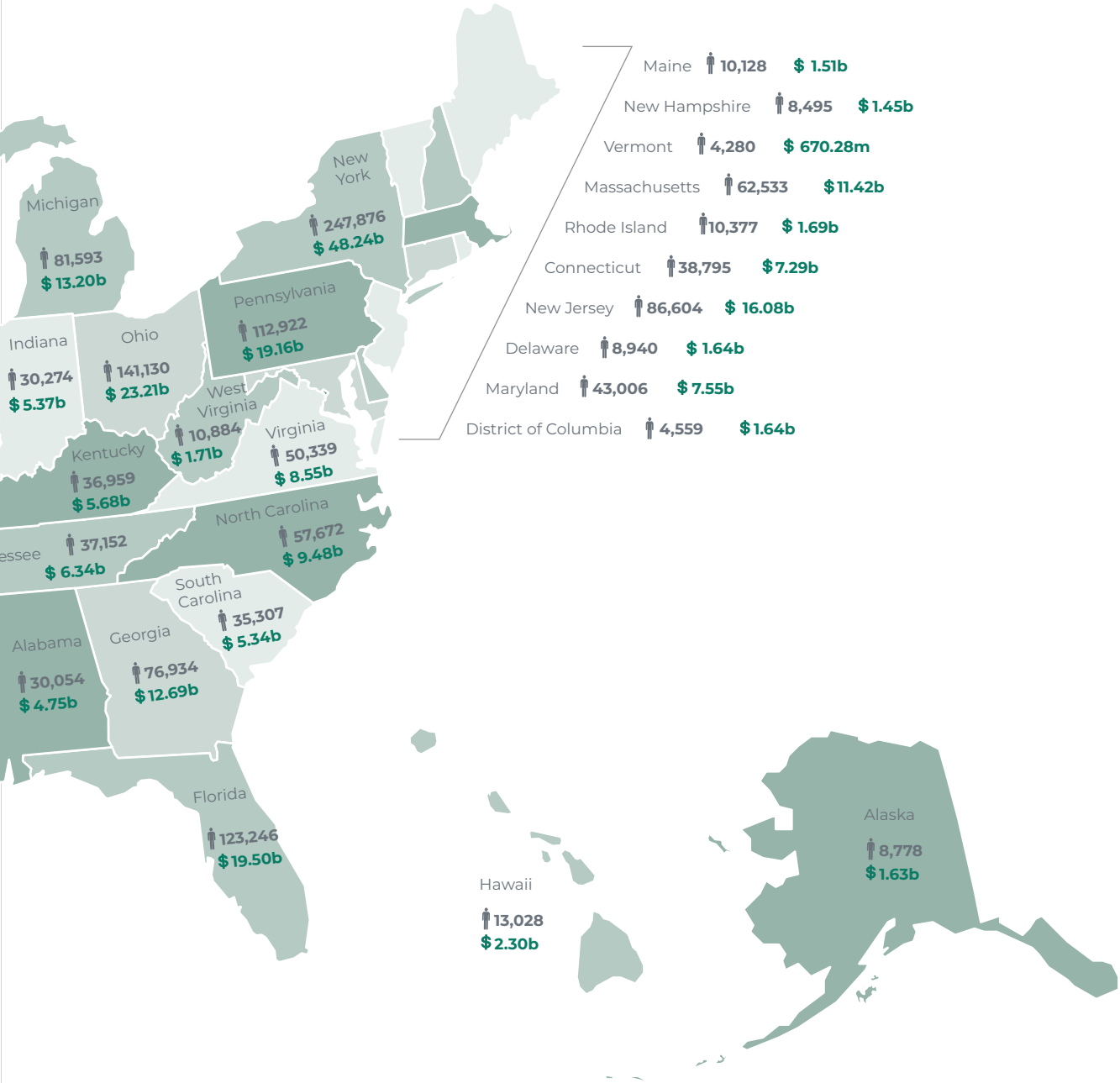

Maine 10,128 $ 1.51b
New Hampshire 8,495 $ 1.45b
Vermont 4,280 $ 670.28m
Massachusetts 62,533 $ 11.42b
Rhode Island 10,377 $ 1.69b
Connecticut 38,795 $ 7.29b
New Jersey 86,604 $ 16.08b
Delaware 8,940 $ 1.64b
Maryland 43,006 $ 7.55b
District of Columbia 4,559 $ 1.64b
Michigan 81,593 $ 13.20b
New York 247,876 $ 48.24b
Pennsylvania 112,922 $ 19.16b
Indiana 30,274 $ 5.37b
Ohio 141,130 $ 23.21b
West Virginia 10,884 $ 1.71b
Virginia 50,339 $ 8.55b
Kentucky 36,959 $ 5.68b
North Carolina 57,672 $ 9.48b
37,152 $ 6.34b
South Carolina 35,307 $ 5.34b
Alabama 30,054 $ 4.75b
Georgia 76,934 $ 12.69b
Florida 123,246 $ 19.50b
Hawaii 13,028 $ 2.30b
Alaska 8,778 $ 1.63b

Table 10: Income and Value Added Impacts, by State (in millions)

State	Income	Value Added
Alabama	$1,356.3	$2,502.3
Alaska	$490.9	$976.7
Arizona	$2,593.6	$4,673.2
Arkansas	$792.7	$1,458.4
California	$25,401.3	$47,265.3
Colorado	$2,675.8	$4,851.7
Connecticut	$2,543.0	$4,550.6
Delaware	$507.4	$1,024.4
DC	$475.0	$694.7
Florida	$5,890.7	$10,829.3
Georgia	$3,862.1	$7,222.2
Hawaii	$683.4	$1,355.4
Idaho	$588.2	$1,048.7
Illinois	$10,348.0	$18,746.6
Indiana	$1,602.7	$2,766.9
Iowa	$963.0	$1,796.2
Kansas	$900.1	$1,621.9
Kentucky	$1,725.5	$2,992.3
Louisiana	$1,813.4	$3,535.8
Maine	$472.7	$833.0
Maryland	$2,509.1	$4,624.3
Massachusetts	$4,224.7	$7,051.4
Michigan	$4,173.1	$7,204.7
Minnesota	$2,679.0	$4,490.2
Mississippi	$854.7	$1,692.8
Missouri	$2,462.3	$4,274.0

State	Income	Value Added
Montana	$402.2	$687.7
Nebraska	$533.7	$983.6
Nevada	$1,332.9	$2,650.4
New Hampshire	$493.1	$851.7
New Jersey	$5,634.1	$9,793.0
New Mexico	$776.1	$1,523.1
New York	$17,604.8	$31,352.3
North Carolina	$2,865.5	$5,235.6
North Dakota	$231.2	$402.0
Ohio	$7,111.3	$13,017.1
Oklahoma	$1,134.3	$2,061.0
Oregon	$2,462.0	$4,337.9
Pennsylvania	$6,645.0	$11,094.0
Rhode Island	$542.3	$991.3
South Carolina	$1,542.7	$2,828.4
South Dakota	$312.6	$564.3
Tennessee	$2,151.7	$3,524.3
Texas	$9,521.6	$17,035.3
Utah	$934.8	$1,786.1
Vermont	$208.6	$366.7
Virginia	$2,737.7	$5,023.1
Washington	$2,448.9	$4,657.1
West Virginia	$502.1	$905.8
Wisconsin	$2,681.2	$4,763.9
Wyoming	$219.0	$461.4

Figure 4: Pension Expenditure Multipliers by State

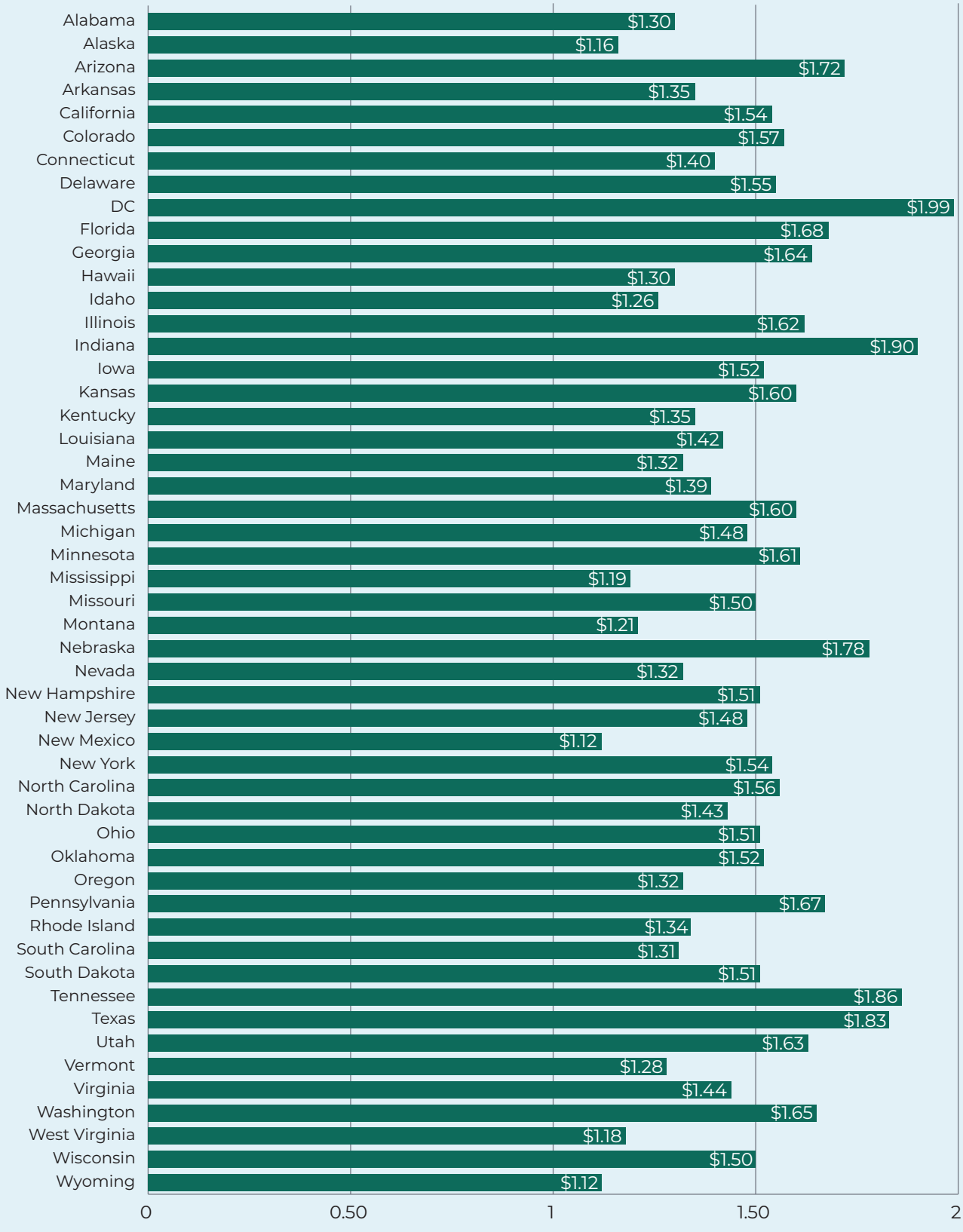


Figure 5: Taxpayer Investment Factors by State

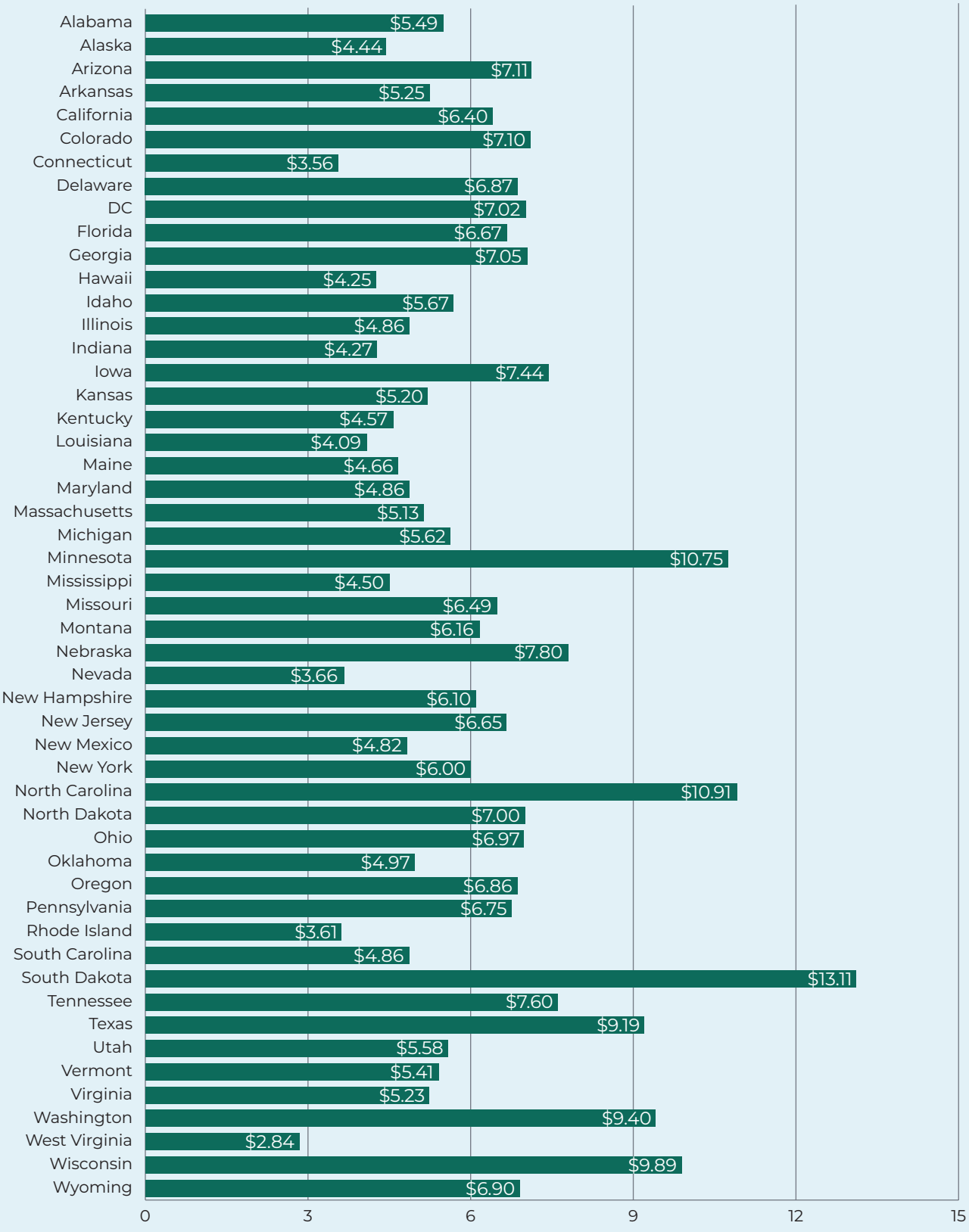


Table 11: Direct, Indirect, and Induced Output Impacts by State

	Output Supported (in $millions)			
	Direct	**Indirect**	**Induced**	**Total***
Alabama	$2,316.4	$1,456.1	$981.7	**$4,754.3**
Alaska	$932.2	$550.8	$404.0	**$1,887.0**
Arizona	$3,147.1	$2,055.6	$1,863.8	**$7,066.5**
Arkansas	$1,155.7	$823.7	$567.4	**$2,546.8**
California	$34,978.4	$20,450.5	$18,231.8	**$73,660.8**
Colorado	$3,417.4	$2,222.9	$1,952.4	**$7,592.7**
Connecticut	$3,299.0	$2,006.8	$1,776.3	**$7,082.1**
Delaware	$587.8	$469.9	$344.9	**$1,402.7**
DC	$343.4	$376.6	$178.7	**$898.7**
Florida	$8,295.5	$5,206.8	$4,732.9	**$18,235.2**
Georgia	$4,671.1	$3,344.6	$2,700.9	**$10,716.5**
Hawaii	$998.7	$542.7	$443.7	**$1,985.2**
Idaho	$774.6	$517.7	$373.0	**$1,665.3**
Illinois	$13,482.7	$7,694.5	$7,500.4	**$28,677.7**
Indiana	$1,711.2	$1,686.1	$1,234.4	**$4,631.8**
Iowa	$1,322.6	$1,217.2	$786.0	**$3,325.8**
Kansas	$1,189.6	$894.8	$617.8	**$2,702.2**
Kentucky	$2,553.5	$1,437.9	$1,111.6	**$5,103.0**
Louisiana	$2,824.0	$1,772.7	$1,336.5	**$5,933.3**
Maine	$703.1	$397.4	$355.8	**$1,456.3**
Maryland	$3,199.0	$1,774.4	$1,547.3	**$6,520.8**
Massachusetts	$4,846.9	$2,999.5	$2,845.2	**$10,691.6**
Michigan	$5,766.1	$3,451.8	$3,027.8	**$12,245.7**
Minnesota	$3,095.9	$2,154.4	$1,948.6	**$7,198.8**
Mississippi	$1,537.8	$822.9	$557.3	**$2,918.0**
Missouri	$3,294.9	$2,102.4	$1,802.6	**$7,199.9**

	Output Supported (in $millions)			
	Direct	**Indirect**	**Induced**	**Total***
Montana	$575.4	$322.5	$244.9	**$1,142.7**
Nebraska	$632.2	$670.4	$436.1	**$1,738.7**
Nevada	$1,925.8	$1,138.8	$896.2	**$3,960.8**
New Hampshire	$609.3	$402.2	$360.9	**$1,372.4**
New Jersey	$7,103.5	$4,404.2	$3,951.6	**$15,459.3**
New Mexico	$1,400.7	$644.3	$496.1	**$2,541.1**
New York	$20,841.6	$11,879.7	$10,059.0	**$42,780.3**
North Carolina	$3,794.1	$2,675.5	$2,100.7	**$8,570.3**
North Dakota	$292.2	$262.6	$160.7	**$715.6**
Ohio	$10,204.4	$5,466.1	$5,024.7	**$20,695.2**
Oklahoma	$1,568.9	$1,085.4	$822.1	**$3,476.4**
Oregon	$3,189.8	$1,853.5	$1,564.9	**$6,608.2**
Pennsylvania	$8,343.7	$5,143.0	$4,826.2	**$18,312.9**
Rhode Island	$857.0	$434.3	$411.1	**$1,702.4**
South Carolina	$2,018.7	$1,339.1	$958.8	**$4,316.6**
South Dakota	$434.9	$311.3	$222.6	**$968.8**
Tennessee	$2,221.5	$1,718.9	$1,483.4	**$5,423.8**
Texas	$11,817.5	$9,600.2	$7,980.7	**$29,398.5**
Utah	$1,144.2	$968.0	$719.9	**$2,832.0**
Vermont	$313.4	$188.0	$152.5	**$654.0**
Virginia	$3,471.9	$2,293.8	$1,840.0	**$7,605.6**
Washington	$3,160.5	$1,966.8	$1,600.3	**$6,727.6**
West Virginia	$725.3	$502.7	$322.3	**$1,550.4**
Wisconsin	$3,503.4	$2,477.2	$1,976.2	**$7,956.8**
Wyoming	$367.3	$285.0	$140.0	**$792.3**

Table 12: Tax Impacts by State (in millions)

	Federal	State/Local	Total
Alabama	$397.8	$390.2	**$788.0**
Alaska	$143.3	$71.7	**$215.0**
Arizona	$711.7	$579.5	**$1,291.2**
Arkansas	$202.1	$245.3	**$447.4**
California	$6,995.3	$8,097.0	**$15,092.3**
Colorado	$757.6	$686.4	**$1,444.1**
Connecticut	$734.9	$777.4	**$1,512.3**
Delaware	$137.1	$124.8	**$261.9**
DC	$88.4	$86.3	**$174.7**
Florida	$1,681.5	$1,017.1	**$2,698.6**
Georgia	$1,037.5	$973.0	**$2,010.5**
Hawaii	$198.5	$161.4	**$359.9**
Idaho	$172.1	$220.0	**$392.1**
Illinois	$2,833.5	$1,893.8	**$4,727.3**
Indiana	$407.9	$324.5	**$732.4**
Iowa	$270.7	$280.3	**$551.0**
Kansas	$249.1	$164.3	**$413.4**
Kentucky	$479.6	$389.8	**$869.4**
Louisiana	$511.6	$351.3	**$862.9**
Maine	$133.0	$156.3	**$289.3**
Maryland	$709.1	$756.1	**$1,465.1**
Massachusetts	$1,111.7	$573.8	**$1,685.5**
Michigan	$1,163.2	$974.2	**$2,137.4**
Minnesota	$720.1	$846.2	**$1,566.3**
Mississippi	$267.2	$195.1	**$462.3**
Missouri	$667.8	$653.1	**$1,320.8**

	Federal	State/Local	Total
Montana	$116.3	$131.0	**$247.3**
Nebraska	$140.1	$157.1	**$297.2**
Nevada	$420.4	$272.9	**$693.2**
New Hampshire	$136.9	$73.5	**$210.4**
New Jersey	$1,620.9	$1,558.1	**$3,179.0**
New Mexico	$240.9	$273.0	**$513.8**
New York	$4,724.1	$3,603.5	**$8,327.6**
North Carolina	$803.2	$792.0	**$1,595.2**
North Dakota	$64.5	$46.2	**$110.7**
Ohio	$1,950.1	$1,794.1	**$3,744.2**
Oklahoma	$306.9	$286.3	**$593.2**
Oregon	$705.8	$838.5	**$1,544.3**
Pennsylvania	$1,737.8	$995.0	**$2,732.8**
Rhode Island	$160.8	$170.1	**$330.9**
South Carolina	$460.4	$504.1	**$964.5**
South Dakota	$85.2	$40.6	**$125.8**
Tennessee	$536.7	$308.3	**$845.0**
Texas	$2,482.0	$1,491.5	**$3,973.5**
Utah	$264.2	$293.3	**$557.6**
Vermont	$60.2	$72.8	**$133.0**
Virginia	$791.8	$782.6	**$1,574.5**
Washington	$727.0	$477.6	**$1,204.6**
West Virginia	$150.1	$183.6	**$333.6**
Wisconsin	$753.7	$812.5	**$1,566.1**
Wyoming	$76.8	$52.6	**$129.4**

CONCLUSION

DB pension plans provide a critical source of reliable income for 23.8 million Americans. These plans are a cost effective way to provide secure lifetime income for retired Americans and their beneficiaries after a lifetime of work. Moreover, DB pension plans generate economic benefits that reach well beyond those who earned benefits during their working years.

Because pensions supply secure income to retirees, pensions provide local economies with stable sources of revenue. Retirees who spend their paychecks regularly in their local economies—especially during tough economic times—provide vital revenues to local businesses and income to local workers.

These economic gains are considerable. Nationwide, nearly $1.3 trillion in total economic output resulted from DB pension expenditures in 2018. DB expenditures supported 6.9 million American jobs that paid $394.2 billion in income in that year. Benefits paid by DB pensions supported $191.9 billion in tax revenue at the local, state, and federal levels.

In supplying a stable source of income to retirees, DB pension plans support the national economy, as well as local economies throughout the country, with jobs, incomes, and tax revenue. Pension benefits play an important role in providing a stable, reliable source of income regardless of economic climate—not just for retired Americans, but also for the local economies in which their retirement checks are spent.

TECHNICAL APPENDIX

DB Pension Data

State and local pension benefit payments were taken from the U.S. Census Bureau's Annual Survey of Public Pensions, which reports on state and local government-sponsored pension plans in the United States. The survey provides data on revenues, expenditures, financial assets, and membership in public employee retirement systems.[38] The Census Bureau aggregates plan level data up to the state-level, and these state-level estimates are based on a representative sample of retirement systems throughout the country, weighted for accuracy. We use data for fiscal year 2018, as that was the most recent data available.

Federal pension data used in this study comes from the U.S. Congressional Research Service.[39] Data on private pension benefits comes from the U.S. Census Bureau and U.S. Bureau of Labor Statistics' Current Population Survey Annual Social and Economic Supplement (CPS ASEC), which reports sources of household income, including pension and survivor income.[40] In previous iterations of Pensionomics, the CPS broke out private pension survivor benefits separately, so we added those into this line. In the most recent data, however, survivor income is not broken out by type of pension (i.e., federal, state/local, military, and private), so this is not included here. This is likely why the total amount of private pension benefit we report is lower than in Pensionomics 2018. To separate out multiemployer plan and single employer plan benefits, we aggregate data on benefit payments from multiemployer plans from the Form 5500 data filings, and then subtract this from the total private plan data from the CPS to report the single employer payments.

Migration

Upon retirement, not all workers continue to reside in their home states. When a pension beneficiary moves out of state, the individual takes the pension payments with them, spending those pension checks in the new state of residence, rather than in the state where the pension payment originated. Since our state-level analysis information is based on where pension benefits are spent, we need to account for the movement of retirees from one state to another. To estimate the net effects of retiree movement across state borders, we use data from the 2018 American Community Survey, which tabulates current state of residence and current residence one year before, by age.[41] From this, we are able to calculate the recent net migration patterns of people aged 65 and older. We assume that migration patterns for state and local government retirees mirror those of all other older Americans.

Disposable Income and Taxation

Before calculating the economic impacts of pension benefit expenditures, we account for income taxes that are paid out of pension benefit payments. By doing so, we are able to utilize IMPLAN's institution spending pattern feature, which estimates household spending patterns by income class, and assumes that every dollar entered into the model is spent.

Disposable income is calculated by subtracting income taxes from gross pension payments. To estimate federal income taxes due from state and local pension income, we use data from the Congressional Budget Office on effective federal income tax rates for elderly households in the United States by income quintiles.[42] Effective tax rates are different from marginal tax rates in that effective tax rates account for tax deductions, credits, or other alterations that may change the total amount of the tax that individuals actually pay. This is useful to our purposes, because, since we are using aggregated sample data, we cannot assess actual individuals' federal tax liabilities. The effective tax rate allows us to more accurately estimate the taxes that pension beneficiaries actually pay to the federal government.

Due to lack of current data, we are not able to use effective tax rates for state income taxes on the elderly as were used in Pensionomics 2012. Instead, we begin with average marginal tax rates on pension income from the National Bureau of Economic Research, based on their TaxSIM model.[43] We also use information from the Center on Budget and Policy Priorities to account for any public pension exclusions a state may provide.[44] State income tax exclusions are important to consider, because many states offer full or partial income tax exclusions for pension benefits. About half the states either do not subject pension income to income tax, or offer sizeable tax breaks for such income. Because average marginal tax rates are higher than average effective tax rates, for the remaining states with

small exclusions or no advantageous tax treatment, our calculations likely overestimate state income tax receipts, at the same time that they underestimate net pension income and resulting economic benefit.

Estimating taxes paid by pensioners requires assuming that beneficiaries are taxed by the state of residence, not the state of the pension's origin. This assumption is consistent with the treatment under federal law that was changed so that after 1995 states' rights to tax retirement income generated from work in the state by individuals who are no longer residents was eliminated for DB and other qualified retirement plans.[45] For example, a retiree moving from New York to Arizona would pay Arizona income taxes on her pension benefit, not New York taxes.

IMPLAN Modeling

This study uses IMPLAN, an input-output modeling software and data package, to estimate the economic impacts of benefits paid by DB pension plans. IMPLAN was first developed in the 1970s as part of a USDA Forest Service project to analyze the economic effects of local land management projects such as timber, mining, and recreation activities. Since that time, IMPLAN has been used by industry and government analysts throughout the country to assess economic impacts of highly varied local community development projects; these studies include many recent economic impact studies of pension benefit payments. Because of differences in modeling and the data used, the results of our study may not be comparable with these other analyses. Thus, the reader should avoid drawing conclusions based on comparisons between our results and those of other studies.

IMPLAN is an input-output model that uses a matrix to represent the economy of a region in order to estimate the effect of events occurring in a single industry or institution on all other industries, as well as consumers, government, and foreign suppliers to the economy. IMPLAN uses a Social Accounting Matrix (SAM), which captures all the industry and institution transactions in the local area; subsections of a SAM describe various structures and functions of a local economy. The SAM describes a local economy in terms of the flow of dollars from purchasers to producers within a region, while also accounting for non-industrial transactions such as payment of taxes by businesses and households. This offers a better portrayal of the household income effect portion of local economic events than other models.

Between when NIRS' original Pensionomics study was published in 2009 and the release of Pensionomics 2012, IMPLAN underwent significant modeling changes. Version 2, used in the original study, used an Econometric Regional Purchase Coefficient (RPC) method. The more recent Version 3, utilized in our study since Pensionomics 2012, uses a trade flow model. Due to its internal consistency and by accounting for spatial variables like the proximity and size of alternative markets, the trade flow model is presumed to be superior to econometric methods for estimating regional RPCs.[46] Internet sales, for example, are given a lower impedance in the trade flows model than in the econometric RPC model, especially compared to the other retail sectors, meaning that it is more likely that such e-commerce will be imported. Thus, interstate commerce leakages in the trade flows model are likely to be higher than in the previous versions. Due to these changes, results of the current study are not directly comparable to those of the 2009 Pensionomics study, and the reader should avoid drawing conclusions based on such comparisons.

In addition, in its newest data releases, IMPLAN changed the household income ranges that it uses to model household expenditure patterns. Furthermore, in the most recent iteration of Pensionomics, pension households moved up into a higher income bracket range within the IMPLAN model. Due to these changes, along with fundamental changes to the US economy that occur each year, the reported national multiplier has increased since the last study, while multipliers at the state level are varied.

National and state by state IMPLAN data for 2018 were used, as this corresponded with the Census data on public pension payments, for which 2018 was the most recently available. For this study, each state's aggregated, in-state, disposable pension payments are entered into IMPLAN as direct payments to households. IMPLAN estimates household spending patterns by income class. The household income range used is based on the 2018 median household income among pension-receiving households age 65 and older, taken from the 2019 Current Population Survey ASEC.[47]

Benefits that migrate out of state are assumed to be spent in the receiving state. Therefore, each state's economic impact includes out of state benefit payments in addition to benefits originating from pension systems in the state. Pension benefits, net of migration, are calculated based on the migration assumptions described above. Then estimated income taxes are subtracted to yield net after-tax pension payments. These net payments are then entered into the IMPLAN model for that state.

However, not all the economic benefits stay in the same state in which pension dollars are originally spent. One state's "leakage" is another state's inflow, and since our analysis is concerned with measuring the economic impact of state and local pension benefits, regardless of where they were originally spent, we also need to account for the economic impacts of these benefits across state lines. As IMPLAN Version 3 utilizes a trade flow model to estimate the SAM, we are able to account for the economic effects flowing out of one state and into another by utilizing a Multi-Regional Input-Output Analysis (MRIO). For example, to determine the economic impacts of $1 million in Alabama's pension payments that may flow to the state of Alaska, we set up an MRIO analysis of Alabama's pension payments between Alabama and Alaska. Thus, we are able to recapture some of any single state's economic leakage due to interstate commerce. Additionally, the resulting economic activity in Alaska may spill over or leak into California, and so on and so forth.

However, the ability to capture leakage in IMPLAN through MRIO has technical limitations because the program cannot run a single model that analyzes the impact of one state on all the other states simultaneously. Rather, the number of states that can be linked for such analysis in any single instance is technically limited by the software and by computing power. This means that the states need to be divided among a number of batches comprising subnational groups, and that the flow of economic impact across these groups is lost. For this study, states were grouped into large economic regions for the purposes of MRIO analysis, but not aggregated, so that results could be identified for each and every state. This allowed us to capture more of the economic impact.

Gross Economic Impacts

This study measures the gross economic impacts of pension benefit expenditures only, rather than the net economic impacts. Pension payments are a form of deferred compensation, meaning that employees and employers contribute to the pension trust over the course of an employee's career as a portion of the employee's total compensation. Had that employee received that compensation in another form—for example, a slight increase in gross pay each month—s/he would have seen higher disposable income, and presumably would have spent a portion of that income in the local economy at that time. Accurately accounting for the net economic impacts of public pensions would require a dynamic model and data that spans several decades. Because of data limitations, this is not possible.

Although one might be tempted to simply deduct from a single year's gross benefit payments the total employee and employer contributions in that year to capture a net effect, such a measure will not be accurate. First, the contributions for any given year for active employees have no bearing on the benefits paid out in that year to retirees. Due to the nature of prefunded pension systems discussed earlier, older, more mature pension systems could likely be construed as having a larger economic impact than younger, less mature systems, simply because the older system will generally pay out more benefits per current worker. Yet this interpretation would be highly inaccurate, since the whole point of prefunding is that current workers do not pay the benefits of retirees, but pay into the system during the course of their career for their own retirement. Due to these limitations and possible misinterpretations, the analysis we present here assesses gross economic impacts, rather than net impacts.

Tax Revenue

To calculate total tax revenue attributable to state and local pension payments, income taxes paid by beneficiaries on benefit payments are added to taxes paid in all subsequent rounds of spending. For the former, the federal and state taxes are calculated as described above. For the latter, IMPLAN calculates all corporate, personal income, and business taxes that are attributable to each spending round: direct, indirect, and induced expenditures. Total tax revenue is the sum of these two figures, calculated for both in state and out of state benefits.

Multipliers

Multipliers are ratios that relate the overall economic effect to a single unit of any initial event. An output multiplier, for example, displays the total output generated for every dollar that is initially spent in the economy. We calculate a pension expenditure multiplier, which describes the impact on total output for each dollar of pension benefit. For example, a pension expenditure multiplier of 2.2 would mean that for every $1 paid out in a pension benefit, $2.19 of total economic output is supported. We calculated pension expenditure multipliers at the national level and for each of the states.

Pension expenditure multipliers are calculated by dividing the total output supported by retiree expenditures by total

pension payments made in that year. (For the state-level multipliers, this includes pension payments originating within the state as well as outside of the state.)

Readers should note the following caveats when interpreting state-level pension expenditure multiplier results. First, because of the current technical limits of MRIO analysis, the share of leakage captured likely varies somewhat across states. Furthermore, the method we used to calculate the state-level economic multipliers is conservative in two ways. On the one hand, for states that sent out more economic benefit to other states than they received from pension spending in other states, we used the lower in-state economic impact in our calculations. This results in a state-level multiplier that is smaller than the multiplier that results from counting the full impact of that state's pension expenditures on national economy. On the other hand, for states that received more economic benefit from pension spending in other states than they sent out, we excluded the surplus economic benefit from the multiplier calculation. Thus, the state-level multipliers published in this study are generally conservative.

We also calculate "taxpayer investment factors" at the national and state levels. This measurement is designed to capture a sense of "return on investment" for each dollar contributed in taxpayer contributions to state and local plans, following the methodology developed by Fountain and Waste.[48] First, we proxy the proportion of benefits paid out in 2018 that were attributable to taxpayer contributions. We do this by calculating (both nationally and for each state), the proportion of total state and local pension plan revenues that are attributable to taxpayer contributions over the period 1993 through 2018. We then multiply this percentage by the benefits paid by state and local pension plans (again at the national or state level) in 2018. This becomes the denominator for our taxpayer contribution factor. The numerator is the total output supported by retiree expenditures in 2018. Put another way, the taxpayer investment factor is the benefit multiplier divided by the taxpayer contribution percentage.

Caution should be used in interpreting the taxpayer investment factor for some states, due to the way the Census Bureau reports taxpayer and employee contributions. Because the Census Bureau data reflects the taxable status of contributions only, but not the pre-tax salary reduction cost-sharing methods used in some states (Nevada, for example), employee contributions may be reported as taxpayer contributions. This will tend to overstate the proportion of pension benefits that are attributable to taxpayer contributions and understate the taxpayer investment factors we report.

Alternatively, to the extent that any particular pension fund has not received its full Annual Required Contribution between 1993 and 2018, the proportion of pension fund receipts attributable to the employer contribution may be understated. This will tend to understate the proportion of pension benefits attributable to taxpayer contributions and overstate the taxpayer investment factors we report.

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