

#### ANALYSIS 20 SEPTEMBER, 2021

#### Prepared by

Mark Zandi Mark.Zandi@moodys.com Chief Economist

Bernard Yaros Bernard.YarosJr@moodys.com Assistant Director

#### **Contact Us**

Email help@economy.com

U.S./Canada +1.866.275.3266

EMEA +44.20.7772.5454 (London) +420.224.222.929 (Prague)

**Asia/Pacific** +852.3551.3077

All Others +1.610.235.5299

Web www.economy.com www.moodysanalytics.com

# Macroeconomic Impact of Home and Community-Based Services Expansion

#### **INTRODUCTION**

The rapid aging of the U.S. population is putting a serious strain on the people, institutions and businesses that provide much-needed assistance to the elderly and disabled. Given the quickly rising costs and severe shortages of workers able to provide this assistance, more of the help is provided through informal care by family and friends. By expanding access to Medicaid home and community-based services, as proposed in the budget reconciliation package now before Congress, the elderly and disabled population will receive higher-quality care from better trained and more highly paid direct care workers. Meanwhile, more of those people who now informally care for the elderly and disabled will be able to take other jobs. The economy will receive an immediate boost from this increased government spending along with a lift in long-term growth from higher labor force participation, particularly by lower-income females who are currently most likely to provide home care.

# Macroeconomic Impact of Home and Community-Based Services Expansion

BY MARK ZANDI AND BERNARD YAROS

he rapid aging of the U.S. population is putting a serious strain on the people, institutions and businesses that provide much-needed assistance to the elderly and disabled. Given the quickly rising costs and severe shortages of workers able to provide this assistance, more of the help is provided through informal care by family and friends. By expanding access to Medicaid home and community-based services, as proposed in the budget reconciliation package now before Congress, the elderly and disabled population will receive higher-quality care from better trained and more highly paid direct care workers. Meanwhile, more of those people who now informally care for the elderly and disabled will be able to take other jobs. The economy will receive an immediate boost from this increased government spending along with a lift in long-term growth from higher labor force participation, particularly by lower-income females who are currently most likely to provide home care.

#### Some facts

One-fifth of the U.S. population will be over the age of 65 by 2050, more than double the share in 1950. Those over the age of 85 will grow even more quickly, constituting 4% of the population in 2050, 10 times their share in 1950. As the population ages, there has been a surge in the elderly and disabled with functional and cognitive limitations in need of assistance. Indeed, approximately two-thirds of 65-year-olds will need help living with such limitations at some point.

This assistance is provided in several different ways, including nursing homes and other institutional facilities, home and community-based care, and informal care provided by family and friends. The cost of providing this care is soaring, with consumer prices for nursing homes and adult daycare more than doubling over the past 20 years. For context, overall consumer prices have risen by half that over the same period (see Chart 1). Formal care has become unaffordable for many, pushing more family members and close friends of elderly and disabled persons into informal caregiving arrangements. The

#### estimated economic value of informal care

is more than half the total value of formal long-term services and supports to elderly people, including nursing homes, retirement communities, and home health and personal care agencies (see Chart 2).

There are approximately 40 million unpaid informal care providers mostly caring for their parents and for elderly persons over 85 years old (see Chart 3). These providers are predominantly women. Close to one-fourth of women between the ages of 45 and 65 provide informal eldercare, compared with less than one-fifth of men (see Chart 4). This is a factor limiting female labor force participation and forcing others to work only part time (see Chart 5). Among the 36 industrialized countries currently in the Organization for Economic Cooperation and Development, the U.S. ranked 17th in 2000 in the participation of prime-age women in the workforce. It has since slipped to 30th. While the lack of family-friendly policies like parental leave and child care subsidies played a role—making it tougher for American women to juggle motherhood and work—the virtual absence

of support for eldercare provides another likely explanation why the share of women taking part in the labor force stalled in the late 1990s after steadily rising for 50 years.

#### Quantifying the impact

We use the Moody's Analytics model of the U.S. economy to determine the impact on the economy from the expansion of Medicaid home and community-based services. To provide context, four scenarios are considered. The first scenario assumes that President Biden was unable to enact any major fiscal policy changes, including the American Rescue Plan that was passed into law this past March. The second scenario is that only the ARP was passed into law, while the third scenario is that both the nearly \$600 billion infrastructure bill and the \$3.5 trillion social infrastructure plan currently working its way through Congress are passed into law this year. And finally, the fourth scenario assumes that all of this gets into law, except for \$250 billion in spending to increase access to home and community-based care under Medicaid.

The Moody's model is similar in theory and empirics to those used by the Federal Reserve Board and Congressional Budget Office for forecasting, budgeting and policy analysis. The model has been used to evaluate the plethora of fiscal and monetary policies implemented during the COVID-19 pandemic.

To determine the long-term economic impact of these scenarios, the Moody's model is simulated over the decade through 2031. This is consistent with the Congressional Budget Office's horizon for the federal government's budget and policy analysis. The assumption is that the plan will become law later this year under budget reconciliation rules and implemented beginning in 2022. That is, no other significant fiscal policy changes are legislated.

Monetary policy is determined in the model based on the Federal Reserve Board's newly announced framework for conducting monetary policy in which the Fed has committed not to begin normalizing interest rates until the economy is at full employment and inflation has been consistently above the Fed's 2% inflation target. All the scenarios assume that the worst of the COVID-19 crisis and its economic fallout are over, and that the pandemic would steadily wind down.

#### **Economic benefit**

The expansion of Medicaid home and community-based services for the elderly and disabled results in a modestly stronger

economy over the coming decade, with higher GDP and more jobs (see Table 1). The policy boosts near-term economic growth as the government spending to provide the expanded services increases. The multiplier—the increase in GDP for a \$1 increase in federal government spending or tax cuts—is an estimated 1.17 (see Table 2). Multipliers on government spending to help the unemployed or those under severe financial stress are higher, but multipliers on tax cuts are meaningfully lower.

Long term, the economy receives a lift from this policy, as it supports higher labor force participation and labor force growth. By 2031, the policy increases real GDP by almost 0.2 percentage point and raises employment by nearly 300,000 jobs. The number of home health and personal care aides, which was expected to increase quickly even without the policy considered here, will increase by more than one-third over the next decade with this policy support, making it one of the fastest growing occupations. And despite this large increase in jobs, it just keeps pace with the growth in the retirement-age population and is the minimum needed to address the severe shortage of home and community-based services. This policy also includes greater investments in higher wages and benefits for essential homecare workers, which will be critical to attract much-needed workers to this occupation, where the median annual

wage is currently more than one-third lower than that of the typical job. It will also reduce the high turnover rates that undermine the ability to provide high-quality services to the elderly and disabled.

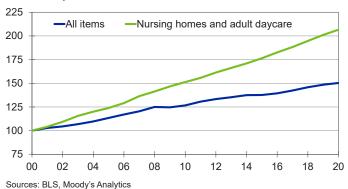
As both employment and labor force participation increase as a result of this policy, there is not a meaningful impact on the unemployment rate. The increase in jobs results in lower unemployment, all else equal, but because of the increase in labor force participation, which means more labor supply, the unemployment rate is unchanged.

#### Conclusion

The expansion of Medicaid home and community-based services will address the increasingly serious problem of providing good quality care to the elderly and disabled and allow many of those currently providing this informal care to family and friends to take other jobs. The elderly and disabled population is large and will grow quickly in coming decades, putting enormous strain on the already-fragile system that provides vital care to these Americans. Without additional government support, the system threatens to buckle. And without this support, the economy's long-term growth prospects will be diminished. That is because many who could otherwise take jobs—but instead must provide care to the elderly and disabled—will be unable to do so.

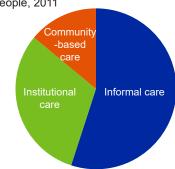
## Chart 1: Soaring Cost of Eldercare...

Consumer prices, 2000=100



### Chart 2: ... Pushes More Into Informal Care

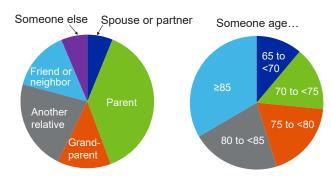
Estimated economic value of long-term services and supports for elderly people, 2011



Sources: CBO, Moody's Analytics

# Chart 3: Who's Being Cared For?

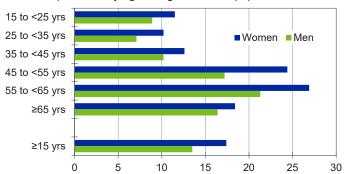
% of all eldercare providers caring for...



Sources: BLS, Moody's Analytics

# Chart 4: Women Shoulder the Burden...

Eldercare providers by age and gender, % of population, 2017-18



Sources: BLS, Moody's Analytics

# Chart 5: ...Limiting Their Ability to Work

Labor force participation rate among women ages 25 to 54, %, SA

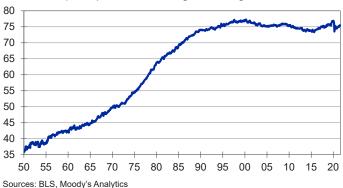


Table 1: Macroeconomic Impact of Home and Community-Based Services Expansion

	Home & community- based spending	No additional support		American Rescue Plan		REAL GDP  ARP, bipartisan & reconciliation		ARP, bipartisan & reconciliation x home care		Home care impact	
	\$ bil, annualized	2012\$ bil	Ann. growth	2012\$ bil	Ann. growth	2012\$ bil	Ann. growth	2012\$ bil	Ann. growth	% Diff	\$ bil diff
2020Q1	•	18,952	(5.0)	18,952	(5.0)	18,952	(5.0)	18,952	(5.0)	-	-
2020Q2		17,258	(31.4)	17,258	(31.4)	17,258	(31.4)	17,258	(31.4)	-	-
2020Q3	-	18,561	33.4	18,561	33.4	18,561	33.4	18,561	33.4	_	-
2020Q4		18,768	4.5	18,768	4.5	18,768	4.5	18,768	4.5	-	_
2021Q1		18,854	1.9	19,056	6.4	19,056	6.4	19,056	6.4	-	-
2021Q2		18,936	1.7	19,361	9.6	19,361	9.6	19,361	9.6	-	-
2021Q3		19,078	3.0 4.7	19,707 19,959	7.3 5.2	19,707 19,959	7.3 5.2	19,707 19,959	7.3 5.2	-	-
2021Q4 2022Q1		19,297 19,637	7.2	20,150	3.9	20,203	5.0	20,197	4.9	0.03	5.8
2022Q1		19,935	6.2	20,268	2.4	20,420	4.4	20,413	4.3	0.03	7.7
2022Q3		20,218	5.8	20,374	2.1	20,633	4.2	20,623	4.2	0.05	9.9
2022Q4		20,432	4.3	20,488	2.2	20,821	3.7	20,809	3.7	0.06	12.2
2023Q1	11.9	20,580	2.9	20,601	2.2	21,003	3.5	20,989	3.5	0.06	13.3
2023Q2		20,722	2.8	20,718	2.3	21,165	3.1	21,151	3.1	0.07	14.1
2023Q3		20,865	2.8	20,840	2.4	21,324	3.0	21,309	3.0	0.07	15.0
2023Q4		20,993	2.5	20,967	2.5	21,474	2.9	21,459	2.8	0.07	15.8
2024Q1		21,108	2.2	21,087	2.3	21,608	2.5	21,591	2.5	0.08	16.8
2024Q2		21,208	1.9	21,184	1.8	21,723	2.1	21,705	2.1	0.08	17.9
2024Q3 2024Q4		21,321 21,439	2.1	21,282 21,388	2.0	21,829 21,930	2.0	21,810 21,910	2.0	0.09	19.0
2024Q4 2025Q1		21,439	2.1	21,484	1.8	22,024	1.7	22,003	1.7	0.09	21.4
2025Q2		21,656	1.9	21,575	1.7	22,113	1.6	22,090	1.6	0.10	23.0
2025Q3		21,758	1.9	21,668	1.7	22,201	1.6	22,176	1.6	0.11	24.4
2025Q4		21,861	1.9	21,762	1.7	22,295	1.7	22,269	1.7	0.12	25.8
2026Q1	27.1	21,964	1.9	21,858	1.8	22,386	1.6	22,358	1.6	0.12	27.7
2026Q2	28.5	22,069	1.9	21,958	1.8	22,482	1.7	22,452	1.7	0.13	29.6
2026Q3	29.8	22,174	1.9	22,059	1.9	22,577	1.7	22,546	1.7	0.14	31.0
2026Q4		22,282	2.0	22,165	1.9	22,681	1.8	22,648	1.8	0.14	32.7
2027Q1		22,394	2.0	22,274	2.0	22,784	1.8	22,750	1.8	0.15	33.3
2027Q2		22,515	2.2	22,390	2.1	22,887	1.8	22,854	1.8	0.15	33.9
2027Q3 2027Q4		22,639 22,762	2.2	22,511	2.2	22,996 23,106	1.9	22,962 23,071	1.9	0.15	34.2
2027Qq 2028Q1		22,885	2.2	22,753	2.2	23,214	1.9	23,180	1.9	0.15	34.5
2028Q2		23,006	2.1	22,873	2.1	23,321	1.9	23,286	1.9	0.15	34.8
2028Q3		23,128	2.1	22,994	2.1	23,427	1.8	23,392	1.8	0.15	34.8
2028Q4		23,247	2.1	23,111	2.1	23,537	1.9	23,501	1.9	0.15	35.2
2029Q1	31.1	23,367	2.1	23,230	2.1	23,649	1.9	23,614	1.9	0.15	35.2
2029Q2		23,486	2.1	23,349	2.1	23,763	1.9	23,728	1.9	0.15	35.5
2029Q3		23,604	2.0	23,467	2.0	23,884	2.0	23,848	2.0	0.15	35.5
2029Q4		23,723	2.0	23,587	2.1	24,006	2.1	23,970	2.1	0.15	35.8
2030Q1 2030Q2		23,844 23,966	2.1	23,708 23,829	2.1	24,133 24,265	2.1	24,097 24,229	2.1	0.15	36.1
2030Q2 2030Q3		24,088	2.1	23,951	2.1	24,403	2.3	24,229	2.3	0.15	36.7 37.3
2030Q3		24,213	2.1	24,075	2.1	24,543	2.3	24,506	2.3	0.15	38.0
2031Q1		24,337	2.1	24,200	2.1	24,687	2.4	24,649	2.4	0.16	38.6
2031Q2		24,463	2.1	24,325	2.1	24,831	2.4	24,792	2.3	0.16	39.2
2031Q3		24,589	2.1	24,450	2.1	24,974	2.3	24,934	2.3	0.16	39.8
2031Q4	31.1	24,716	2.1	24,577	2.1	25,112	2.2	25,072	2.2	0.16	40.4
2020	-	18,385	-3.7	18,385	-3.7	18,385	-3.7	18,385	-3.7	-	-
2021	-	19,041	3.6	19,520	6.2	19,520	6.2	19,520	6.2	-	-
2022	8.2	20,055	5.3	20,320	4.1	20,519	5.1	20,510	5.1	0.04	8.9
2023	13.9	20,790	3.7	20,782	2.3	21,241	3.5	21,227	3.5	0.07	14.6
2024	19.2	21,269	2.3	21,235	2.2	21,773	2.5	21,754	2.5	0.08	18.5
2025	24.1	21,707	2.1	21,622	1.8	22,158	1.8	22,134	1.7	0.11	23.7
2026	29.1	22,122	1.9	22,010	1.8	22,531	1.7	22,501	1.7	0.13	30.2
2027 2028	31.1	22,578 23,066	2.1	22,452 22,933	2.0	22,943 23,375	1.8	22,909 23,340	1.8	0.15	34.0
2028	31.1	23,545	2.2	23,408	2.1	23,825	1.9	23,790	1.9	0.15	35.5
2030	31.1	24,028	2.1	23,891	2.1	24,336	2.1	24,299	2.1	0.15	37.0
2031	31.1	24,526	2.1	24,388	2.1	24,901	2.3	24,862	2.3	0.16	39.5
	5-11	,,,,=0		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		, ,	=.0		=.5		

Source: Moody's Analytics

Table 1: Macroeconomic Impact of Home and Community-Based Services Expansion (Cont.)

Home & community-			tional support		an Rescue Plan	NONFARM EMPLOYMENT  ARP+ bipartisan+  ARP, biparti				isan & Home care imp		
	based spending \$ bil, annualized	Mil	•	Mil		Mil	reconciliation	reconciliat Mil	Change the		Diff, ths	
202001	•		Change, ths		Change, ths		Change, ths		Change, ths	% Diff	Dill, tils	
2020Q1 2020Q2	-	151.9 133.7	(18,210)	151.9 133.7	(18,208)	151.9 133.7	(18,208)	151.9 133.7	(18,208)	-		
2020Q2 2020Q3		140.8	7,090	140.8	7,089	140.8	7,089	140.8	7,089			
2020Q4	-	142.6	1,817	142.6	1,817	142.6	1,817	142.6	1,817	-		
2021Q1	-	143.1	431	143.4	731	143.4	731	143.4	731	-	_	
2021Q2	-	143.5	448	145.0	1,648	145.0	1,648	145.0	1,648	-	-	
2021Q3	-	144.3	810	147.0	2,041	147.0	2,041	147.0	2,041	-		
2021Q4	-	145.3	950	148.6	1,592	148.6	1,592	148.6	1,592	-		
2022Q1	5.9	146.2	960	149.7	1,079	149.7	1,095	149.7	1,052	0.03	43	
2022Q2	7.4	147.2	970	150.3	586	150.6	863	150.5	849	0.04	57	
2022Q3 2022Q4	9.0	148.1 149.0	900 890	150.7 151.2	441	151.2 151.8	593 583	151.1 151.7	577 567	0.05	73 89	
2022Q4 2023Q1	11.9	149.8	840	151.6	425	152.3	535	152.2	517	0.00	107	
2023Q1 2023Q2	13.2	150.6	770	152.0	426	152.8	490	152.7	484	0.07	112	
2023Q3	14.5	151.3	690	152.4	369	153.3	462	153.1	457	0.08	118	
2023Q4	15.8	151.8	510	152.6	275	153.7	478	153.6	472	0.08	123	
2024Q1	17.2	152.2	410	152.9	294	154.2	465	154.1	459	0.08	130	
2024Q2	18.5	152.5	300	153.3	335	154.6	454	154.5	447	0.09	138	
2024Q3	19.8	152.8	260	153.5	239	155.1	446	154.9	439	0.09	145	
2024Q4	21.1	153.0	240	153.7	228	155.5	404	155.3	397	0.10	152	
2025Q1	22.3	153.2	200	153.9	132	155.9	371	155.7	362	0.10	162	
2025Q2	23.5	153.4	160	154.0	132	156.2	316	156.0	305	0.11	173	
2025Q3	24.7	153.5	160	154.1	140	156.5	264	156.3	255	0.12	182	
2025Q4 2026Q1	25.8 27.1	153.7 153.9	210 220	154.3 154.5	141 166	156.7 156.9	239 221	156.5 156.7	230 208	0.12	192 204	
2026Q1 2026Q2	28.5	154.2	220	154.6	169	150.9	206	156.9	193	0.13	217	
2026Q3	29.8	154.3	170	154.8	163	157.3	195	157.1	186	0.14	226	
2026Q4	31.1	154.5	190	155.0	173	157.5	192	157.3	181	0.15	237	
2027Q1	31.1	154.7	190	155.1	176	157.7	187	157.5	184	0.15	240	
2027Q2	31.1	154.9	200	155.3	194	157.9	181	157.6	177	0.15	244	
2027Q3	31.1	155.1	190	155.5	201	158.1	182	157.8	181	0.16	245	
2027Q4	31.1	155.3	210	155.7	210	158.2	182	158.0	181	0.16	247	
2028Q1	31.1	155.5	210	156.0	224	158.4	196	158.2	191	0.16	252	
2028Q2	31.1	155.8	230	156.2	240	158.6	202	158.4	200	0.16	253	
2028Q3	31.1	156.0	230	156.4	238	158.8	204	158.6	204	0.16	252	
2028Q4	31.1	156.2	230	156.7	236	159.0	212	158.8	210	0.16	254	
2029Q1 2029Q2	31.1	156.5 156.7	250 240	156.9 157.2	236 238	159.3 159.5	214 220	159.0 159.2	215 219	0.16	253 254	
2029Q3	31.1	156.9	240	157.4	238	159.7	221	159.5	222	0.16	253	
2029Q4	31.1	157.2	240	157.6	238	159.9	220	159.7	219	0.16	254	
2030Q1	31.1	157.4	250	157.9	251	160.1	223	159.9	222	0.16	255	
2030Q2	31.1	157.7	240	158.1	249	160.4	224	160.1	221	0.16	259	
2030Q3	31.1	157.9	240	158.4	246	160.6	224	160.3	221	0.16	262	
2030Q4	31.1	158.2	240	158.6	246	160.8	223	160.6	220	0.16	265	
2031Q1	31.1	158.4	240	158.9	245	161.0	225	160.8	222	0.17	268	
2031Q2	31.1	158.6	240	159.1	242	161.3	225	161.0	222	0.17	271	
2031Q3	31.1	158.9	240	159.3	240	161.5	223	161.2	220	0.17	274	
2031Q4	31.1	159.1	240	159.6	240	161.71	224	161.44	221	0.17	276	
2020		1/2 2	(9 (72 2)	1/2 2	(0 (71 2)	1.62.2	(0 (71.2)	1/2 2	(0 (71 2)			
2020 2021	-	142.3 144.0	(8,672.2) 1,765.7	142.3 146.0	(8,671.3)	142.3	(8,671.3)	142.3	(8,671.3) 3,740.2	-	-	
2021	8.2	144.0	3,589.5	150.5	4,468.9	150.8	4,810.6	150.7	4,745.4	0.04	65	
2023	13.9	150.9	3,250.0	152.1	1,675.4	153.0	2,201.9	152.9	2,152.2	0.04	115	
2024	19.2	152.6	1,745.0	153.4	1,218.6	154.9	1,842.2	154.7	1,815.8	0.09	141	
2025	24.1	153.5	837.5	154.1	710.6	156.3	1,439.9	156.1	1,404.3	0.11	177	
2026	29.1	154.2	795.0	154.7	625.9	157.2	911.8	157.0	867.8	0.14	221	
2027	31.1	155.0	770.0	155.4	727.8	158.0	752.5	157.7	729.4	0.15	244	
2028	31.1	155.9	857.5	156.3	888.9	158.7	775.0	158.5	766.4	0.16	253	
2029	31.1	156.8	955.0	157.3	949.7	159.6	855.2	159.3	854.3	0.16	254	
2030	31.1	157.8	970.0	158.2	979.6	160.5	888.4	160.2	881.9	0.16	260	
2031	31.1	158.8	960.0	159.2	976.5	161.4	895.2	161.1	883.2	0.17	272	

Source: Moody's Analytics

# Table 2: Federal Fiscal Multipliers

 $\$  change in GDP in 2022Q1 for a once-and-for-all  $1\$  change in federal spending or revenue in 2021Q1

Supplemental Nutrition Assistance Program (SNAP)	1.61
Supplemental Unemployment Insurance	1.49
Work-Share Unemployment Insurance	1.37
Aid to State and Local Governments	1.34
Low Income Home Energy Assistance Program (LIHEAP)	1.31
Transportation Infrastructure Spending	1.29
Defense Spending	1.24
Child Care (Universal Child Care Act)	1.19
Universal Pre-K (3- and 4-year-olds)	1.17
Home and Community-Based Eldercare	1.17
Federal revenues  Earned Income Tax Credit	1.27
Child Tax Credit	1.25
Economic Impact Checks Payroll Tax Holiday for Employees	1.09 1.07
	0.95
Payroll Tax Holiday for Employers	0.93
Non-Refundable Lump-Sum Tax Rebate Personal Income Tax Rate	0.93
	0.80
Housing Tax Credit	
Student Loan Debt Forgiveness Dividend and Conical Coince Tay Page	0.65
Dividend and Capital Gains Tax Rate	0.38
Corporate Tax Rate	0.32
Accelerated Depreciation	0.27
Net Operating Losses	0.24

Source: Moody's Analytics

#### **About the Authors**

Mark Zandi is chief economist of Moody's Analytics, where he directs economic research. Moody's Analytics, a subsidiary of Moody's Corp., is a leading provider of economic research, data and analytical tools. Dr. Zandi is a cofounder of Economy.com, which Moody's purchased in 2005.

Dr. Zandi's broad research interests encompass macroeconomics, financial markets and public policy. His recent research has focused on mortgage finance reform and the determinants of mortgage foreclosure and personal bankruptcy. He has analyzed the economic impact of various tax and government spending policies and assessed the appropriate monetary policy response to bubbles in asset markets.

A trusted adviser to policymakers and an influential source of economic analysis for businesses, journalists and the public, Dr. Zandi frequently testifies before Congress on topics including the economic outlook, the nation's daunting fiscal challenges, the merits of fiscal stimulus, financial regulatory reform, and foreclosure mitigation.

Dr. Zandi conducts regular briefings on the economy for corporate boards, trade associations and policymakers at all levels. He is on the board of directors of MGIC, the nation's largest private mortgage insurance company, and The Reinvestment Fund, a large CDFI that makes investments in disadvantaged neighborhoods. He is often quoted in national and global publications and interviewed by major news media outlets, and is a frequent guest on CNBC, NPR, Meet the Press, CNN, and various other national networks and news programs.

Dr. Zandi is the author of Paying the Price: Ending the Great Recession and Beginning a New American Century, which provides an assessment of the monetary and fiscal policy response to the Great Recession. His other book, Financial Shock: A 360º Look at the Subprime Mortgage Implosion, and How to Avoid the Next Financial Crisis, is described by The New York Times as the "clearest guide" to the financial crisis.

Dr. Zandi earned his BS from the Wharton School at the University of Pennsylvania and his PhD at the University of Pennsylvania. He lives with his wife and three children in the suburbs of Philadelphia.

Bernard Yaros is an assistant director and economist at Moody's Analytics focused primarily on federal fiscal policy. He is responsible for maintaining the Moody's Analytics forecast models for federal government fiscal conditions and the 2020 presidential election, as well as providing real-time economic analysis on fiscal policy developments coming out of Capitol Hill. Besides fiscal policy, Bernard covers the District of Columbia and Puerto Rico and develops forecasts for Switzerland.

Bernard holds an MSc in international trade, finance and development from the Barcelona Graduate School of Economics and a BA in political economy from Williams College.

# **About Moody's Analytics**

Moody's Analytics provides financial intelligence and analytical tools supporting our clients' growth, efficiency and risk management objectives. The combination of our unparalleled expertise in risk, expansive information resources, and innovative application of technology helps today's business leaders confidently navigate an evolving marketplace. We are recognized for our industry-leading solutions, comprising research, data, software and professional services, assembled to deliver a seamless customer experience. Thousands of organizations worldwide have made us their trusted partner because of our uncompromising commitment to quality, client service, and integrity.

Concise and timely economic research by Moody's Analytics supports firms and policymakers in strategic planning, product and sales forecasting, credit risk and sensitivity management, and investment research. Our economic research publications provide in-depth analysis of the global economy, including the U.S. and all of its state and metropolitan areas, all European countries and their subnational areas, Asia, and the Americas. We track and forecast economic growth and cover specialized topics such as labor markets, housing, consumer spending and credit, output and income, mortgage activity, demographics, central bank behavior, and prices. We also provide real-time monitoring of macroeconomic indicators and analysis on timely topics such as monetary policy and sovereign risk. Our clients include multinational corporations, governments at all levels, central banks, financial regulators, retailers, mutual funds, financial institutions, utilities, residential and commercial real estate firms, insurance companies, and professional investors.

Moody's Analytics added the economic forecasting firm Economy.com to its portfolio in 2005. This unit is based in West Chester PA, a suburb of Philadelphia, with offices in London, Prague and Sydney. More information is available at <a href="https://www.economy.com">www.economy.com</a>.

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). Further information is available at <a href="https://www.moodysanalytics.com">www.moodysanalytics.com</a>.

DISCLAIMER: Moody's Analytics, a unit of Moody's Corporation, provides economic analysis, credit risk data and insight, as well as risk management solutions. Research authored by Moody's Analytics does not reflect the opinions of Moody's Investors Service, the credit rating agency. To avoid confusion, please use the full company name "Moody's Analytics", when citing views from Moody's Analytics.

# **About Moody's Corporation**

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). MCO reported revenue of \$5.4 billion in 2020, employs more than 11,400 people worldwide and maintains a presence in more than 40 countries. Further information about Moody's Analytics is available at www.moodysanalytics.com.

© 2021 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S CREDIT RATINGS AFFILIATES ARE THEIR CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MATERIALS, PRODUCTS, SERVICES AND INFORMATION PUBLISHED BY MOODY'S (COLLECTIVELY, "PUBLICATIONS") MAY INCLUDE SUCH CURRENT OPINIONS. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINAN-CIAL LOSS IN THE EVENT OF DEFAULT OR IMPAIRMENT. SEE APPLICABLE MOODY'S RATING SYMBOLS AND DEFINITIONS PUBLICATION FOR INFORMATION ON THE TYPES OF CONTRACTUAL FINANCIAL OBLIGATIONS ADDRESSED BY MOODY'S CREDIT RATINGS. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS, NON-CREDIT ASSESSMENTS ("ASSESSMENTS"), AND OTHER OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATE-MENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. AND/OR ITS AFFILIATES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT AND DO NOT PROVIDE REC-OMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS, ASSESSMENTS AND OTHER OPINIONS AND PUBLISHES ITS PUBLICATIONS WITH THE EXPECTATION AND UNDERSTAND-ING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSID-ERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS, AND PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS OR PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT INTENDED FOR USE BY ANY PERSON AS A BENCHMARK AS THAT TERM IS DEFINED FOR REGULATORY PURPOSES AND MUST NOT BE USED IN ANY WAY THAT COULD RESULT IN THEM BEING CONSIDERED A BENCHMARK.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing its Publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY CREDIT RATING, ASSESSMENT, OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any credit rating, agreed to pay to Moody's Investors Service, Inc. for credit ratings opinions and services rendered by it fees ranging from \$1,000 to approximately \$5,000,000. MCO and Moody's Investors Service also maintain policies and procedures to address the independence of Moody's Investors Service credit ratings and credit rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold credit ratings from Moody's Investors Service and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moodys.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any credit rating, agreed to pay to MJKK or MSFJ (as applicable) for credit ratings opinions and services rendered by it fees ranging from JPY125,000 to approximately JPY550,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.