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Highlights

- Long-range transportation plans for the Wasatch Front include the construction of an additional 25 miles of light rail, 76 miles of commuter rail, 227 miles of bus rapid transit, and 29 miles of mountain transportation rail line—all by 2040. This study evaluates the employment, population, and personal income impacts for Utah associated with the construction of these projects on an accelerated schedule, resulting in the 2040 plan reaching completion by 2025.
- The $11 billion in projects is divided between $6.0 billion for bus rapid transit, $2.1 billion for commuter rail, $1.6 billion for mountain transportation rail, $928.0 million for light rail, and $394.4 million for streetcar rail. Two-thirds or $7.4 billion of the expenditures are estimated to be spent in Utah, on either direct employment or purchases from Utah firms. The in-state share of spending is estimated to be 55.3 percent for all modes except bus rapid transit, which is expected to have a local spending share of 77.3 percent. Annual average project spending for the 13 years from 2013 through 2025 is estimated to be $845.3 million, with the in-state portion averaging $568.7 million.
- Combined direct payroll accounts for nearly two-thirds of the direct project spending in Utah, totaling $4.1 billion over the 13-year period, at an annual average of $315.3 million. Direct purchases of goods and services produced in Utah total $1.9 billion and average $145.1 million per year. Finally, retail and wholesale margins on gross purchases from suppliers are $258.8 million in total, which is on average $19.9 million annually.
- Employment (direct, indirect, and induced) associated with the construction of the 2025 build-out scenario totals 3,120 in 2013, then peaks at 6,975 in 2019 and plateaus near there through 2022, as does project spending. It then declines to 3,043 in 2025, the final year of the projects.
- Population impacts increase more gradually, rising from 661 in 2013 and peaking in 2024 at 7,927.
- Personal income impacts increase from $256.7 million in 2013 to $888.8 in 2022, and fall subsequently.
- There is a wide range of regional economic impacts associated with transit investments, such as those resulting from the ongoing operation and maintenance of the system expansions as well as those which cumulatively improve regional economic competitiveness relative to others. These have not been considered in this study.

Fast-Tracking Wasatch Front Transit Investments: Economic and Demographic Impacts of a 2025 Build-Out

Pamela S. Perlich, Ph.D., Senior Research Economist

Introduction

Over the next 30 years, the Wasatch Front will significantly expand its transit network. Plans include the construction of an additional 25 miles of light rail, 76 miles of commuter rail, 227 miles of bus rapid transit, and 29 miles of mountain transportation rail line. These projects will be built in Davis, Morgan, Salt Lake, Tooele, Utah, and Weber counties, and are included in the long-range plans of the Wasatch Front Regional Council and the Mountainland Association of Governments. This study evaluates the employment, population, and personal income impacts associated with the construction of these projects on an accelerated schedule, resulting in the 2040 plan reaching completion by 2025.

This estimated $11 billion (constant 2010 dollars)[1] investment in the regional transit system would significantly affect the economic development potential and relative competitiveness of the entire metropolitan area. Further, the projects will have major impacts on land use patterns, real estate developments, travel costs, and accessibility within and across the region. Transportation planners and policy analysts justifiably focus on these types of comprehensive, long-run impacts. However, the significant short-run economic activity resulting from these major construction projects should be recognized as well. As these projects proceed, workers are directly employed in the design and construction of the system, and additional employment and income is generated through purchases from Utah contractors and suppliers. Once built, the operation and maintenance of the system generates further, sustained economic activity. Depending upon the specifics of the projects, and the magnitude, distribution, and timing of associated expenditures, these massive investments clearly have a wide range of far-reaching economic influence on the region.

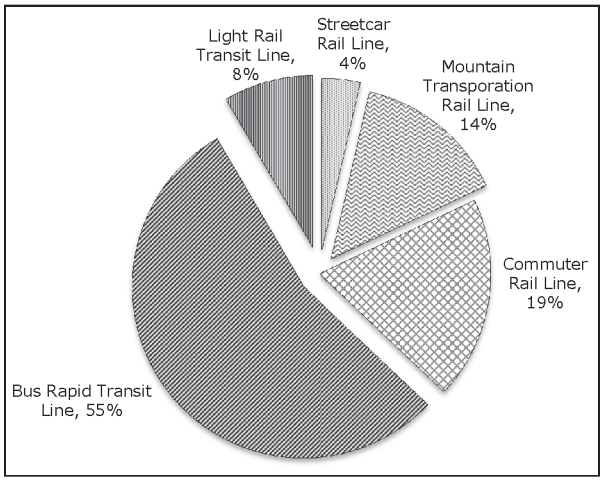
This study evaluates the employment, population, and personal income impacts associated with a scenario that accelerates the construction program to reach completion by 2025. The Utah Transit Authority has sponsored this research project.

1. All monetary values in this report are constant 2010 dollars.

Projects Included in the Transit Investment Plan

Total spending for the 2025 build-out of the proposed 2040 long-range plan is outlined in Figure 1 and Table 1. The $11 billion in projects is divided between $6.0 billion for bus rapid transit, $2.1 billion for commuter rail, $1.6 billion for mountain transportation rail, $928.0 million for light rail, and $394.4 million for streetcar rail. Two-thirds or $7.4 billion of the expenditures are estimated to be spent in Utah, on either direct employment or purchases from Utah firms. The in-state share of spending is estimated to be 55.3 percent for all modes except bus rapid transit, which is expected to have a local spending share of 77.3 percent. Annual average project spending for the 13 years from 2013 through 2025 is estimated to be $845.3 million, with the in-state portion averaging $568.7 million.

Figure 1
Mode Share of Total Expenditures: 2025 Build-Out



Source: BEBR analysis of UTA data modeling.

In-state spending associated with the design and construction of the build-out on this accelerated schedule is shown in Table 2 and Figures 2 and 3. This spending includes direct payrolls (wages, salaries, and benefits) of persons employed in the construction sector and also in professional and technical services. Cumulative payroll for the project period is estimated to be $2.6 billion in the construction sector and $1.5 billion in the professional and technical services sector. There will also be purchases from Utah firms that produce goods and services totaling $1.9 billion. These include purchases from the mining sector (e.g., quarrying, aggregates, etc.), manufacturers (metals, plastic pipe, concrete products, etc.), and services (e.g., equipment rental, remediation, etc.). Finally, these projects will result in purchases of inputs that are produced outside of Utah, but with vendors—both retail and wholesale—located in-state. Only a portion (trade margins) of the gross purchase amount stays in Utah, since the products were imported from out-of-state. For retail purchases this margin is estimated to be, on average, 30 percent, and for wholesale purchases it is estimated to be 15 percent.[2] For impact modeling purposes, only the margined portion of gross purchases, calculated here to be $259 million, are included as direct impacts to the Utah economy. Combined direct payroll accounts for nearly two thirds of the direct project spending in Utah, totally $4.1 billion over the 13-year period, at an annual average of $315.3 million. Direct purchases of goods and services produced in Utah are just under a third (30 percent) of direct impact spending, totaling $1.9 billion and averaging $145.1 million per year. Finally, retail and wholesale margins on gross purchases from suppliers are $258.8 million in total, which is on average $19.9 million annually, or just 4 percent of the total.

Table 1
Total Estimated Spending by Mode: Total, In-State, and Out-of-State
(Millions of Constant 2010 Dollars)

	Total	In-State	Out-of-State	In-State Share
Streetcar Rail Line	$394.4	$218.1	$176.2	55.3%
Mountain Transportation Rail Line	$1,578.9	$873.3	$705.6	55.3%
Commuter Rail Line	$2,098.9	$1,160.9	$938.0	55.3%
Bus Rapid Transit Line	$5,989.3	$4,627.5	$1,361.8	77.3%
Light Rail Transit Line	$928.0	$513.3	$414.7	55.3%
Total	$10,989.4	$7,393.1	$3,596.4	67.3%
Annual Average (2013–2025)	$845.3	$568.7	$276.6	67.3%

Note: Purchases of rights of way and bond interest are excluded.
Source: BEBR analysis of UTA data modeling.

The time path of annual in-state spending (with margined trade) increases steadily from $265.0 million in 2013 to $624.3 million for each year from 2019 through 2022. Thereafter annual in-state project spending declines to reach $312.2 million in 2025, the year of project completion.

Economic Activity and Impacts of Transit Investments

There is a wide range of regional economic impacts associated with transit investments. As previously noted, this study evaluates the employment, personal income, and population impacts of the construction of the projects in Utah. Beyond these, economic activity and employment will result from the ongoing operation and maintenance of the system expansions. Furthermore, the existence of these additional transportation options will potentially improve the performance of the overall regional transportation system by reducing travel time, increasing accessibility, and improving air quality and safety. If achieved, these will cumulatively improve regional economic competitiveness relative to others. If the new investments increase accessibility of major employment centers, demand for parking infrastructure and traffic congestion can both be reduced, again increasing regional productivity. The spatial distribution as well as types of development (and land use patterns in general) will also be affected by transit investments. Economic impacts of all of these additional consequences of transit developments beyond the impact of the construction phase can be and are evaluated, but are beyond the scope of this work.[3]

2. This estimate is based on a BEBR analysis of BEA margin data included in the most recent RIMS II model for Utah.

3. See Cambridge Systematics, Inc. (1999) "Public Transportation and the Nation's Economy: A Quantitative Analysis of Public Transportation's Economic Impact."

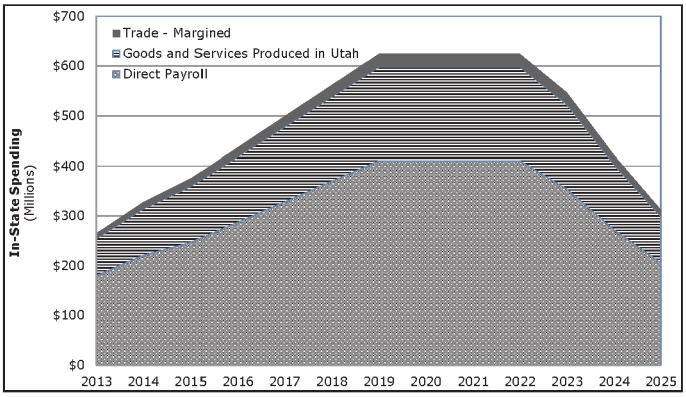
Table 2
In-State Spending for Transit Build-Out by 2025
(Millions of Constant 2010 Dollars)

	Annual Spending—Major Sector Level										2013–2025	
	2013	2014	2015	2016	2017	2018	2019–2022	2023	2024	2025	Cumulative	Average
Direct Payroll												
Construction	$102.9	$128.6	$154.3	$180.1	$205.8	$231.5	$257.2	$231.5	$180.1	$128.6	$2,572.2	$197.9
Professional & Technical Services	$76.3	$91.6	$91.6	$106.8	$122.1	$137.4	$152.6	$122.1	$91.6	$76.3	$1,526.3	$117.4
Summary Purchases by Sector: Goods and Services Produced in Utah												
Mining, Quarrying, Oil & Gas Extract.	$9.1	$11.4	$13.7	$16.0	$18.3	$20.6	$22.9	$20.6	$16.0	$11.4	$228.6	$17.6
Asphalt	$0.5	$0.7	$0.8	$0.9	$1.1	$1.2	$1.3	$1.2	$0.9	$0.7	$13.3	$1.0
Plastic Pipe	$1.2	$1.5	$1.8	$2.0	$2.3	$2.6	$2.9	$2.6	$2.0	$1.5	$29.2	$2.2
Ready Mix Concrete	$6.6	$8.2	$9.9	$11.5	$13.2	$14.8	$16.4	$14.8	$11.5	$8.2	$164.4	$12.6
Concrete Products	$5.3	$6.6	$7.9	$9.2	$10.5	$11.8	$13.1	$11.8	$9.2	$6.6	$131.4	$10.1
Metals Manufacturing	$2.9	$3.7	$4.4	$5.2	$5.9	$6.6	$7.4	$6.6	$5.2	$3.7	$73.7	$5.7
Car Rental	$4.1	$5.1	$6.1	$7.1	$8.2	$9.2	$10.2	$9.2	$7.1	$5.1	$102.1	$7.9
Real Estate & Rental & Leasing	$36.9	$46.2	$55.4	$64.6	$73.9	$83.1	$92.3	$83.1	$64.6	$46.2	$923.3	$71.0
Waste & Remediation Services	$2.7	$3.4	$4.1	$4.8	$5.4	$6.1	$6.8	$6.1	$4.8	$3.4	$67.9	$5.2
Entertainment & Recreation	$0.6	$0.8	$1.0	$1.1	$1.3	$1.5	$1.6	$1.5	$1.1	$0.8	$16.2	$1.2
Accommodations & Food Services	$3.2	$3.9	$4.7	$5.5	$6.3	$7.1	$7.9	$7.1	$5.5	$3.9	$78.8	$6.1
Other Services	$2.3	$2.9	$3.4	$4.0	$4.6	$5.1	$5.7	$5.1	$4.0	$2.9	$57.0	$4.4
Purchases from Utah Suppliers and Distributors (Goods Produced Out-of-State)												
Wholesale Trade	$43.7	$54.6	$65.5	$76.4	$87.3	$98.2	$109.2	$98.2	$76.4	$54.6	$1,091.5	$84.0
Retail Trade (Building Materials)	$10.1	$12.7	$15.2	$17.7	$20.3	$22.8	$25.3	$22.8	$17.7	$12.7	$253.4	$19.5
Retail Trade (General Merchandise)	$2.5	$3.2	$3.8	$4.5	$5.1	$5.7	$6.4	$5.7	$4.5	$3.2	$63.7	$4.9
Totals												
Direct Payroll	$179.2	$220.2	$245.9	$286.9	$327.9	$368.9	$409.9	$353.6	$271.6	$204.9	$4,098.5	$315.3
Purchases of Goods and Services Produced in Utah	$75.4	$94.3	$113.2	$132.0	$150.9	$169.7	$188.6	$169.7	$132.0	$94.3	$1,886.1	$145.1
Gross Trade	$56.3	$70.4	$84.5	$98.6	$112.7	$126.8	$140.9	$126.8	$98.6	$70.4	$1,408.5	$108.3
Gross Total (Trade Not Margined)	$311.0	$384.9	$443.6	$517.5	$591.4	$665.4	$739.3	$650.1	$502.3	$369.7	$7,393.1	$568.7
Trade – Margined*	$10.4	$12.9	$15.5	$18.1	$20.7	$23.3	$25.9	$23.3	$18.1	$12.9	$258.8	$19.9
Grand Total (Trade Margined)	$265.0	$327.4	$374.6	$437.0	$499.5	$561.9	$624.3	$546.6	$421.8	$312.2	$6,243.4	$480.3

* Retail trade is margined at 30% and wholesale trade is margined at 15%.
Source: Bureau of Economic and Business Research, University of Utah analysis of UTA data modeling.

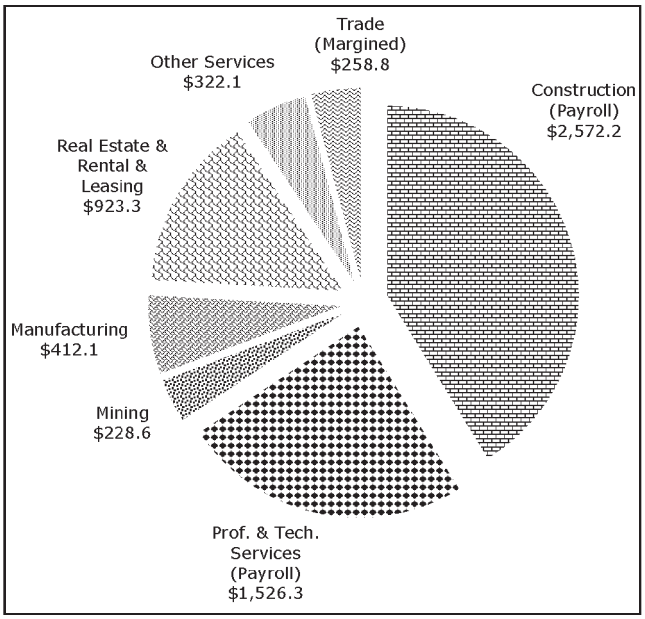
Traditional regional economic impact studies make a distinction between economic impacts, which are net new economic activity resulting when production within a region is externally financed or purchased, and economic activity, which is a rearrangement of

Figure 2
Major Categories of In-State Spending, 2013–2025
(Millions of Constant 2010 Dollars)



Source: Bureau of Economic and Business Research, University of Utah analysis of UTA data modeling.

Figure 3
Cumulative In-State Spending, 2013–2025
(Millions of Constant 2010 Dollars)



Source: Bureau of Economic and Business Research, University of Utah analysis of UTA data modeling.

See also: A.C. Nelson, et al. (2009) "The Best Stimulus for the Money: Briefing Papers on the Economics of Transportation Spending," University of Utah.

regional economic activity resulting from changes in internal spending patterns that do not change the overall level of regional economic activity. A classic example of an unambiguous economic impact is the operation of a military base located within a region. Funding for the base is external to the region. Consequently, all economic activity generated by the base is "augmentation"—it adds to the size of the regional economy. In contrast, if a new grocery store establishes a retail operation within the region, it will compete with existing stores for the same pool of residential dollars. This is a rearrangement of internal spending, and is not "net new" economic activity.

Construction projects, however, are located in a bit of a grey zone in this classification system. This is because projects are usually financed through borrowing and the ultimate source of these initial funds is generally not definitively known. However, projects funded by borrowing are considered to be net new "outside" money, and therefore create additions to the economic activity of the region. Transit infrastructure may also receive federal funding, and this results in economic impacts for the same reason as military base operations. However, if taxpayers within the region, through sales or other taxes, directly finance transit investments, these investments are generally classified as generating economic activity, not economic impacts. The size of the regional economy has not changed, but the distribution among activities has changed. However, even this distinction could be argued, since households could use at least some of those funds (i.e., the amount of the taxes to pay for the projects) alternatively to purchase goods and services that are imported into Utah.

The bottom line is that, in this analysis, the mix between "economic impacts" and "economic activity" is not known until the funding mix is also made clear. For example, if we assume that the federal government finances one-quarter of the construction budget, then it follows that at least this one-fourth of economic activity generated by the construction is reclassified to be economic impact, increasing the size of the regional economy. Similarly, the debt-financed portion would be classified as creating economic impacts. The balance, financed locally through taxation, would be classified as economic activity. It is important that the reader understand this ambiguity when interpreting the "economic impacts" reported in this study. This, as noted earlier, is a separate issue for the other "layers" of economic impacts beyond the construction projects themselves.

Employment, Personal Income, and Population Impacts

To recap, economic impacts are generated by externally funded purchases of goods and services that have been produced in Utah. Assuming that the Wasatch Front transit investments analyzed here are fully funded by external sources, this means that the direct employment as well as purchases from Utah firms, both producers and distributors, are defined as the first-round direct economic impacts. These have been modeled, assigned to appropriate years, and used as inputs to the state-level REMI model for Utah. REMI then generates annual indirect impacts, which are the firm-to-firm purchases generated by the first and all successive rounds of firm-to-firm spending. REMI estimates the composition and shares of these that are supplied from within Utah. With each successive computational iteration of the model, employment creation is also estimated. Each employee is attached to a household, and the additional employment also sustains a larger residential population than would have been possible in the absence of these transit investments. Additional in-region household spending resulting from all of this additional employment and income is classified as "induced" economic impacts. This spending also generates successive rounds of in-region employment and income.

The REMI model is an integrated, structural equation model that dynamically estimates the additional population that the regional economy can support over time as a result of all of this additional economic activity. REMI calculates how this additional population (and associated households) change over time (growing older, having children, etc.). The "impact population" could be net new people in the region. Alternatively they could be people who stay in the region because of the transit system construction, who otherwise would have had to leave the region is search of economic opportunity. Temporary heavy construction projects often attract a temporary workforce that sends most earnings to households located outside the region, then leaves when the projects are completed. But, because of the magnitude and duration of these and earlier transit construction projects, the engineering, design, and construction workers will continue to be predominantly Utah residents.

Summary employment, population, and personal income associated with the 2025 build-out are shown in Table 3 and Figure 4.[4] Employment (direct, indirect, and induced) associated with the construction of the 2025 build-out scenario totals 3,120 in 2013, then peaks at 6,975 in 2019 and plateaus near there through 2022,

Table 3
Total Estimated Economic Impacts/Activity of Transit 2025 Build-Out: Employment, Population, and Personal Income

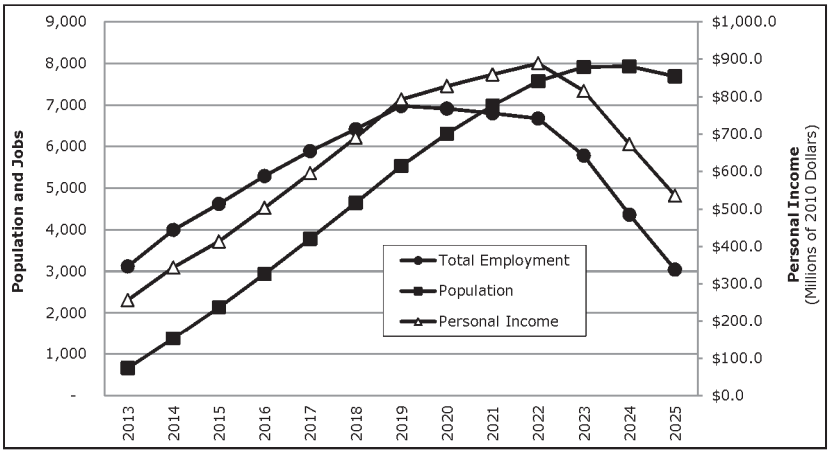
Year	Total Employment	Population	Personal Income (Millions of 2010 Dollars)
2013	3,120	661	$256.7
2014	3,997	1,378	$343.9
2015	4,620	2,131	$413.3
2016	5,290	2,940	$502.9
2017	5,889	3,783	$595.1
2018	6,419	4,647	$690.6
2019	6,975	5,533	$792.6
2020	6,911	6,308	$828.2
2021	6,800	6,985	$859.3
2022	6,672	7,571	$888.8
2023	5,781	7,909	$815.2
2024	4,364	7,927	$672.8
2025	3,043	7,687	$535.8

Source: BEBR analysis of UTA data using the REMI model.

4. Employment is an annual average jobs count, and includes both full- and part-time jobs. This is the Bureau of Economic Analysis definition of jobs, which includes wage and salary employees as well as the self-employed. Population is a person count. Personal income is defined by the Bureau of Economic Analysis to include all income received by all persons from all sources. This includes earned income from labor—wages, salaries, and benefits.

as does project spending. It then declines to 3,043 in 2025, the final year of the projects. Population impacts increase more gradually, rising from 661 in 2013 and peaking in 2024 at 7,927. This different pattern results from the way REMI models labor force and migration responses to employment changes, as well as from the assumptions that it implements concerning the age, household formation, and childbearing behavior of economic migrants. Personal income impacts increase from $256.7 million in 2013 to $888.8 in 2022, and fall subsequently.

Figure 4
Employment, Population, and Personal Income Impacts, 2013–2025



Source: BEBR analysis of UTA data using the REMI model.

Detailed employment impacts by industry are shown in Table 4, and detailed employment by occupation is shown in Table 5. Industries with the largest shares of impacts are Real Estate and Rental and Leasing (equipment rental) with 18 percent of employment in 2019 and Construction with 13 percent of employment in 2019. The next largest employment shares are in the Retail (12 percent) and Health and Social Assistance (11 percent) sectors, both in 2019. Again, the REMI model includes direct, indirect, and induced employment impacts, and also employment that results from additional population that is supported within these additional households. For example, this explains the increased employment in local government, as the additional children of the new households attend public schools and therefore induce the employment of additional teachers. The most numerous occupations among these jobs are Sales, Office, and Administrative (31 percent), Construction and Extraction (10 percent), and Management, Business, and Financial occupations (10 percent).

The age and gender composition of the impact population is shown in Figure 5 and Table 6. Again, the "impact population" is the additional population in the region that would not be present if the employment expansion did not occur. This could mean new workers and their households move to the region. Or, it could mean that people will stay in the region because of the increased economic opportunity who otherwise would have left as economic out-migrants. The impact population is initially small, numbering 2,131 by 2015. The age structure of the impact population is disproportionately young, working-age persons and their dependents. Over the years, as employment associated with the projects increases (including increased demand for goods and services provided by Utah firms), young working adults and their children continue to move to Utah. These additional households

Table 4
Employment Impacts by Industry: Average Annual Employment Equivalents

Industry	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Forestry, Fishing, Related Activities, and Other	1	1	0	0	0	0	0	0	0	0	0	0	0
Mining	34	42	49	55	61	66	72	72	72	72	64	49	34
Utilities	6	7	8	9	10	10	11	11	11	10	9	7	5
Construction	280	458	577	676	756	820	880	882	855	814	689	484	262
Manufacturing	110	133	149	165	179	191	203	194	185	177	149	106	68
Wholesale Trade	106	129	144	161	176	188	203	200	195	191	165	126	91
Retail Trade	425	523	586	664	734	795	859	851	840	828	719	558	418
Transportation and Warehousing	22	25	25	26	27	26	26	23	19	16	9	0	0
Information	30	36	40	45	49	53	57	55	53	51	42	30	20
Finance and Insurance	125	151	164	182	198	211	223	213	202	193	154	102	59
Real Estate and Rental and Leasing	566	706	829	949	1,061	1,162	1,271	1,256	1,239	1,220	1,075	820	575
Professional and Technical Services	118	153	176	201	222	241	261	256	249	242	204	147	94
Management of Companies and Enterprises	9	10	10	9	9	9	8	6	5	3	0	0	0
Administrative and Waste Services	172	214	244	276	305	330	358	351	344	337	289	213	145
Educational Services	39	52	61	73	84	94	105	107	109	109	99	82	66
Health Care and Social Assistance	332	415	471	545	616	683	749	746	741	737	637	487	359
Arts, Entertainment, and Recreation	78	97	112	128	143	157	172	172	171	171	151	118	88
Accommodation and Food Services	203	255	296	341	383	421	461	465	468	470	422	341	264
Other Services, except Public Administration	208	254	285	322	356	385	418	410	402	393	335	247	171
State Government	104	135	158	183	206	227	250	250	249	247	218	170	125
Local Government	154	202	238	278	315	350	387	391	392	392	351	282	215
Total	3,120	3,997	4,620	5,290	5,889	6,418	6,975	6,911	6,801	6,672	5,781	4,364	3,043

Source: Bureau of Economic and Business Research, University of Utah analysis of UTA data modeling using the REMI model.

Table 5
Employment Impacts by Occupation: Average Annual Employment Equivalents

Occupation	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Management, Business, Financial	300	383	442	505	562	612	664	655	642	627	541	402	273
Computer, Math, Architect, Engineer	92	117	135	154	170	185	200	197	192	187	160	117	78
Life, Physical, Social Science	22	28	32	37	41	45	49	49	48	48	41	31	22
Community, Social Service	48	60	67	77	86	94	102	101	100	99	85	64	45
Legal	20	26	30	34	38	42	45	45	44	43	38	28	20
Education, Training, Library	50	65	75	88	100	111	123	124	124	124	110	88	68
Arts, Design, Entertainment, Sports, Media	37	46	52	59	66	72	78	77	76	74	64	48	34
Healthcare	225	282	322	373	421	467	512	511	508	505	438	336	247
Protective Service	98	126	147	170	192	211	232	233	232	230	204	159	118
Food Preparation, Serving Related	215	271	312	360	403	443	485	488	489	489	437	349	267
Building, Grounds, Personal Care, Service	244	305	349	399	444	485	529	524	517	510	443	337	241
Sales, Office, Administrative	1,030	1,289	1,473	1,676	1,858	2,019	2,190	2,162	2,124	2,083	1,804	1,365	963
Farm, Fishing, Forestry	4	4	5	5	6	6	7	7	7	6	5	4	3
Construction, Extraction	234	364	452	527	589	640	689	689	670	643	548	391	225
Installation, Maintenance, Repair	200	258	301	346	386	421	458	454	447	438	381	287	196
Production	122	151	171	193	211	227	244	238	231	224	191	141	95
Transportation, Material Moving	179	224	254	287	315	339	366	359	350	341	293	217	148
Total	3,120	3,997	4,620	5,290	5,889	6,418	6,975	6,911	6,801	6,672	5,781	4,364	3,043

Source: Bureau of Economic and Business Research, University of Utah analysis of UTA data modeling using the REMI Model.

use their incomes to purchase consumer goods and services, as is evident in the distribution of employment impacts by sector discussed above.

Table 6
Population Impacts by Age Group

	Totals by Age Group				
Year	Under 15	15 to 25	25 to 65	65 and Over	Total
2013	164	146	351	0	661
2014	350	286	739	2	1,378
2015	555	413	1,155	8	2,131
2016	782	533	1,608	16	2,940
2017	1,027	641	2,087	28	3,784
2018	1,284	739	2,578	44	4,646
2019	1,555	833	3,081	64	5,533
2020	1,804	896	3,522	87	6,308
2021	2,032	938	3,902	112	6,985
2022	2,238	967	4,225	141	7,571
2023	2,381	953	4,405	171	7,909
2024	2,437	885	4,401	203	7,927
2025	2,419	786	4,246	236	7,687

	Shares of Each Age Group by Year				
Year	Under 15	15 to 25	25 to 65	65 and Over	Total
2013	24.8%	22.1%	53.1%	0.0%	100%
2014	25.4%	20.7%	53.7%	0.2%	100%
2015	26.0%	19.4%	54.2%	0.4%	100%
2016	26.6%	18.1%	54.7%	0.6%	100%
2017	27.1%	17.0%	55.2%	0.7%	100%
2018	27.6%	15.9%	55.5%	1.0%	100%
2019	28.1%	15.1%	55.7%	1.2%	100%
2020	28.6%	14.2%	55.8%	1.4%	100%
2021	29.1%	13.4%	55.9%	1.6%	100%
2022	29.6%	12.8%	55.8%	1.9%	100%
2023	30.1%	12.0%	55.7%	2.2%	100%
2024	30.7%	11.2%	55.5%	2.6%	100%
2025	31.5%	10.2%	55.2%	3.1%	100%

Source: Bureau of Economic and Business Research, University of Utah analysis of UTA data modeling using the REMI Model.

Data Development

Data development and modeling have been based on the actual expenditures on the recently completed Mid-Jordan Light Rail Transit Line project. A team of transportation planning and project evaluation specialists (including engineers, analysts, accountants, and cost-estimators) familiar with the construction of the Mid-Jordan project worked with the Bureau of Economic and Business Research at the University of Utah to model the spending patterns for this scenario. Accounting records were used to analyze the payrolls and purchases from vendors. These purchases were analyzed to determine whether each supplying firm was located in Utah, and if so, whether it was a producer of goods and services or a distributor. The in-house accounting system utilizes the Standard Cost Categories (SCC), a system adopted by the Federal Transportation Administration. The team translated these into the North American Industry Classification System (NAICS), which is required for the economic modeling. These expenditures were mapped to the timing, magnitude, and character of specific elements and activities in the Mid-Jordan construction project. These spending and employment patterns were then scaled in time, proportioned to the planned future projects, and mapped to the construction elements and activities of the planned projects in the UTA 2025 build-out scenario. Note that right-of-way acquisition and debt-servicing expenditures have not been included. This extensive modeling effort, utilizing voluminous accounting and other records, and in consultation with experts in transit design, engineering, cost estimation, and construction, has resulted in expenditure estimates and projections that are much more reliable than commonly applied assumption-based methods. The detailed data methodology is available upon request.

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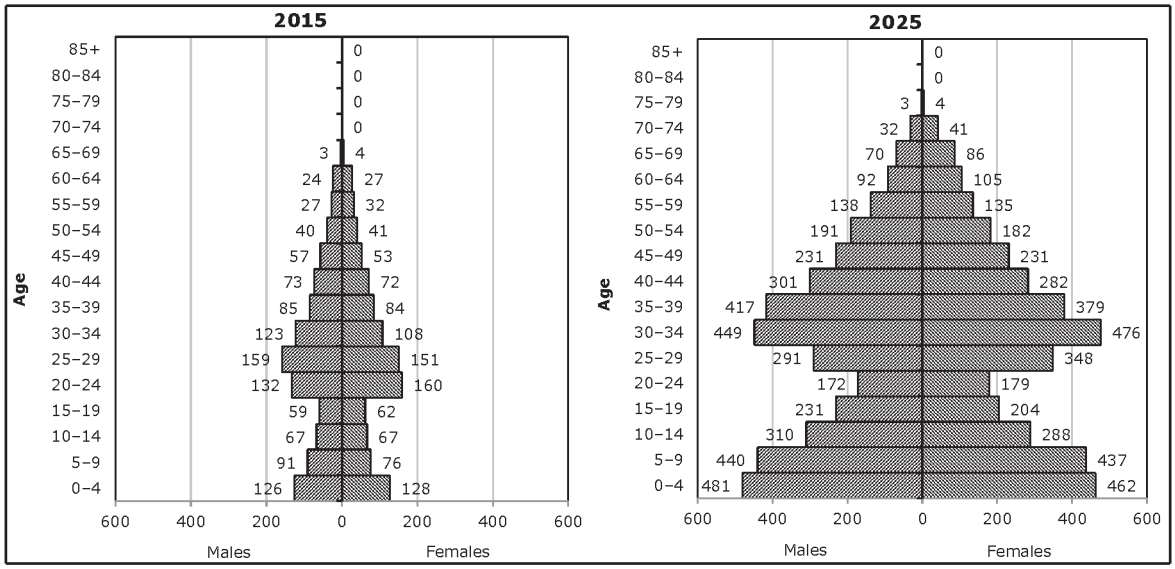
Figure 5
Impact Populations by 5-Year Age Groups and Gender, 2015 and 2025



Source: Bureau of Economic and Business Research, University of Utah analysis of UTA data modeling using the REMI Model.

Members of the Data Development and Data Modeling Team

- Todd Hopkins (Parsons Brinckerhoff, UTA Consultant/Project Controls) served as the project lead, organizing the team and orchestrating the entire data development, analysis, and modeling process. He assembled the project team for the Utah Transit Authority, then organized and supervised data collection and aggregation. He developed the final model used to aggregate NAICS-coded costs, which were translated from the SCC system. He also was instrumental in the design and implementation of the cost-projection model.
- Mike Grodner, PE (Mike Grodner, LLC, UTA Consultant/Program Manager) provided technical support on all phases: data collection, data analysis, and model conceptualization. He specializes in transit- related project engineering and project/ program management. He provided technical support for construction processes, materials and vehicles inventorying, and the SCC-to-NAICS translation.
- Jimmy Vegh (Stanton Constructability Services, LLC, UTA Consultant/Independent Cost Estimator) compiled and analyzed the actual cost accounting journal entries and mapped these to the contractor's bid estimate and the UTA independent cost estimate for construction costs associated with the Mid-Jordan LRT line. This analysis was used as the basis for the cost-projection model. He also built the crosswalk between the contractor-supplied accounting journal entries for materials and equipment into NAICS-coded categories for the aggregate cost-projection modeling.
- Rick Krebs (Stanton Constructability Services, LLC, UTA Consultant/Independent Cost Estimator) analyzed and worked to develop the procedure to relate the cost accounting journal entries to the contractor's bid estimate and UTA independent cost estimate for the Mid-Jordan LRT line expenditures. He also analyzed the contractors' accounting data and classified these according to NAICS for both materials and equipment purchases. He was liaison between UTA and the general contractor and secured access to the Mid-Jordan LRT line's contractor cost data for this research.
- Hans Hubrich (Parsons Brinckerhoff, UTA Consultant/Project Controls) served as a technical advisor in all phases of the process: data collection, data aggregation, and model conceptualization. He also provided technical assistance for construction processes, materials and vehicles inventorying, and the SCC-to-NAICS crosswalk specification.
- Jaime White, PE (Parsons Brinckerhoff, UTA Consultant/Planning Engineer) provided advisory assistance in model conceptualization and long-range project development/project timing and cash flow modeling scenarios for the aggregated cost data.

Bureau of Economic and Business Research
University of Utah
1655 East Campus Center Drive
Salt Lake City, Utah 84112-8939

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