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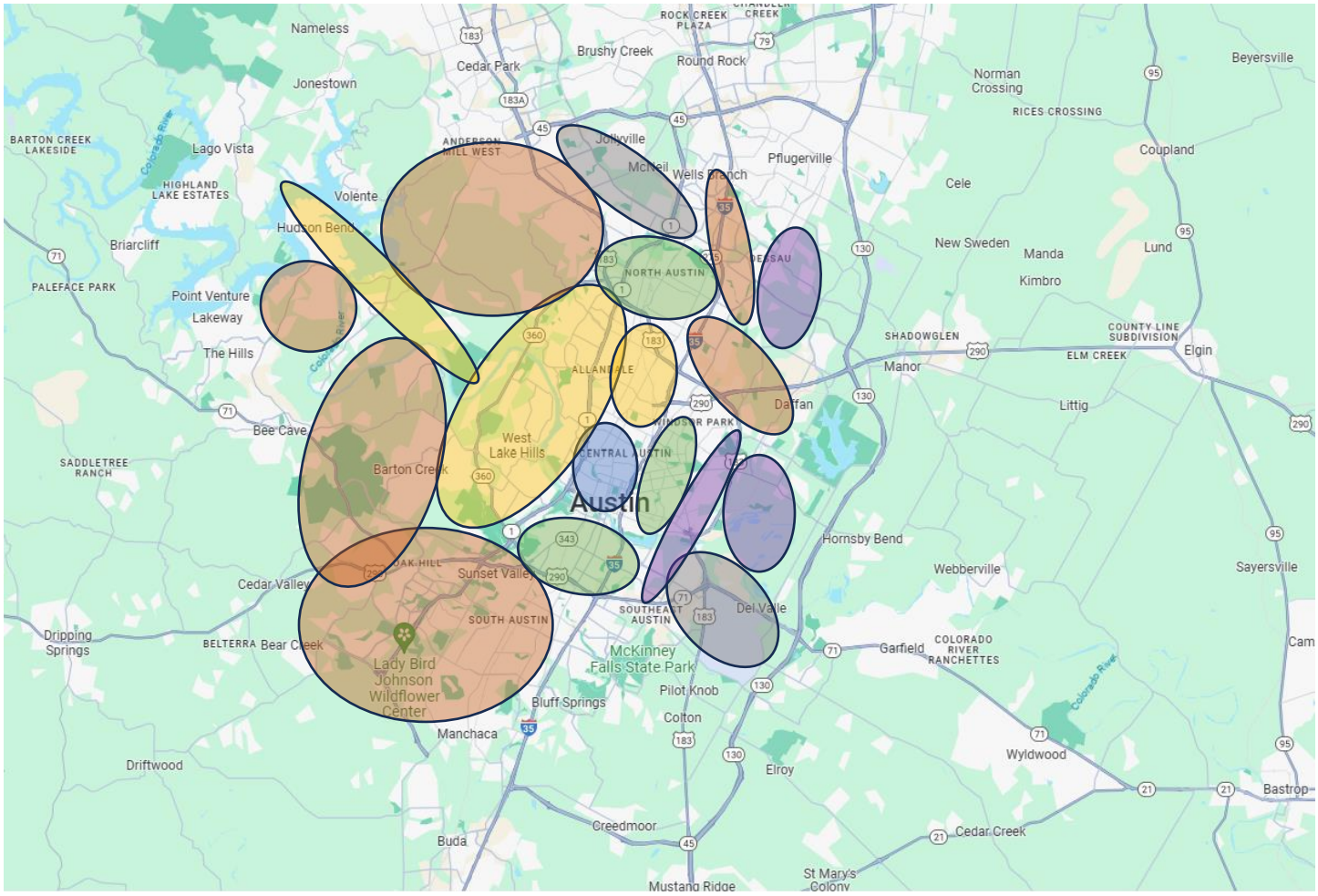
Urban Growth Patterns and Economic Base Analysis

Please describe your hometown (or favorite city) based on our Urban Growth Pattern discussions (Chapter 5 of textbook) and Economic Base Analysis (Chapter 6 of textbook and EBA workbook)

1. *Please explain your city's growth patterns using at least one urban growth theory (i.e. Central Place Theory, Sector Growth Theory, etc…).*
    a. *Include a satellite image or map of your city.*
    b. *Label various property uses on that map (i.e. CBD, suburbs, office, industrial, retail, residential).*
    c. *Provide explanations of maps and other visuals you provide.*

Subject City: Austin, Tx



Key			
	Central Business District		Middle income residential
	Sub business districts		High-class residential
	Low-class residential		Industrial Suburb/ R&D

Austin best resembles Hoyt's sector growth theory. The CBD represents the area bordered by Lake Austin to the south, highway 1 to the west, I-35 to the east, and the University of Texas to the North. Middle- and high-income housing to occupy the area west and southwest of the CBD. Several sub business districts with retail exist south of Lake Austin and in north Austin where highways 1 and 183 intersect. Industrial and low-income housing occupy southeast Austin as well as Austin Bergstrom International Airport. There are additional R&D centers located in northwest Austin between highway 45 and 1. The State Capitol represents the original dominant use within the CBD along with the financial district, law firms, hotels, restaurants, and other subordinate and ancillary uses aggregating over time. Historically, high income residential developed to the immediate north and west of the CBD, primarily to support government officials who worked at the capitol building. Factories/ industrial and low-income housing expanded east and southeast of I-35. The sector theory hypothesized that a city expanded from a central core of the city in land use wedges along major arterials. It also addresses topography and the tendency for varying higher income categories to expand based on elevation of terrain, bodies of water, and major transportation routes. This is exactly how Austin expanded from the central business district. As Austin grew, higher-income families began to develop residential housing to the northwest along Lake Austin, loop 360, and towards the beautiful Texas hill country with rolling hills and excellent views. Middle-income housing developed along highway 1 to the west and southwest. Although major rock deposits and sloping can be found in land to the west and along the lakes, high-income residential was willing to absorb the additional development costs due to the hill country, views, and access to bodies of water. For many years, expansion to the east of I-35 was difficult due to the presence of clay in the soils, which caused settlement issues and higher foundation costs buildings. Overall, the sector (wedge) model seems to describe the growth of Austin most accurately due to growth from a central point of economic activity along major transportation routes which was centered on high-income housing. The concept of filtering (social and economic mobility based on the quality of housing stock) can be seen in the growth of Austin. The concept of scatteration can also be seen as the city developed towards the north with developments such as the domain, creating a major sub business district to the north. Residential development has filled in vacant areas between central and north Austin over the past 20 years.

Austin has seen rapid population growth over the past 10-15 years and has expanded rapidly to the north. As residential development was constrained by Lake Travis to the West and I-35 to the east, the city developed north along highway 1 and out towards loop 183, which connects the Austin to major cities such as Round Rock (northeast) and Cedar Park (northwest). The urban realms model best describes the current structure of Austin as it continues to grow towards the north and south. This urban ecology model argues that cities are composed of several separate independent market areas. Several corporate headquarter relocations have helped spur several independent areas of Austin with their own intrinsic growth characteristics. Tesla relocated to south Austin with Oracle and Apple relocating to north Austin. This has spurred the development of several edge cities and has created an alternate central business in north Austin near The Domain. Without the geographical constraints of the lakes, the greater Austin metroplex should continue to expand north creating several Edge Cities (Taylor, Hutto, Georgetown) and exurbs. South Austin should continue to expand along I-35 towards San Antonio. The sector growth model and overflow effect explain Austin's historical growth while other social ecology models will explain the greater Austin metroplex' future growth.

2. *Using Economic Base Analysis, identify the economic base of your city*
    a. *Utilize tools such as location quotients, economic base multipliers, PERs, and basic industry job growth.*
    b. *Document each step of the EBA process (i.e. list out basic industries)*
        i. *You most likely will be making assumptions. Please list assumptions out at each step of the process.*
    c. *Include your conclusion and insights about the findings.*

See below for calculation of location quotients to determine basic industries within the Austin MSA (data was pulled from the Bureau of Labor statistics using most recent year-end data: 2022:

2022 Employement Estimate (Bureau of Labor Statistics)						
NAICS Code	Industry Sector	Austin MSA	Local Percent (e)	United States	National Percent (E)	Location Quotients
11	Agriculture, forestry, fishing and hunting	1350	0.0013	1,262,170	0.0089	0.1461
21	Mining, quarrying, and oil and gas extraction	3103	0.003	555,956	0.0039	0.7692
22	Utilities	2,906	0.0028	810,850	0.0057	0.4912
23	Construction	74,984	0.0730	7,889,156	0.0553	1.3201
31-33	Manufacturing	69,535	0.0677	12,809,405	0.0898	0.7539
42	Wholesale trade	48,571	0.0473	5,977,132	0.0419	1.1289
44-45	Retail Trade	114,138	0.1111	15,537,613	0.1090	1.0193
48-49	Transportation and warehousing	30,617	0.0298	7,360,629	0.0516	0.5775
51	Information	45,596	0.0444	3,182,631	0.0223	1.9910
61	Educational services	21,089	0.0205	12,564,903	0.0881	0.2327
62	Health care and social assistance	115,998	0.1129	22,317,076	0.1565	0.7214
71	Arts, entertainment, and recreation	15,199	0.0148	2,616,288	0.0183	0.8087
52	Finance and insurance	48,028	0.0468	6,292,480	0.0441	1.0612
53	Real estate and rental leasing	24,895	0.0242	2,379,748	0.0167	1.4491
54	Professional and technical services	149,515	0.1456	10,654,099	0.0747	1.9491
55	Management of companies and enterprises	21,534	0.0210	2,503,466	0.0176	1.1932
56	Administrative and waste services	80,720	0.0786	9,619,981	0.0675	1.1644
72	Accomodation and food services	120,644	0.1175	13,512,345	0.0948	1.2395
81	Other services, except public administration	37,651	0.0367	4,441,275	0.0311	1.1801
99	Unclassified	1,045	0.0010	295,426	0.0021	0.4762
Totals		1,027,118	1.0000	142,582,629	1.0000	1.0000

Analysis of the above location quotients shows many industries that have a greater local share of employment than their national counterparts. However, some of these industries are non-basic (supportive service industries supporting the local Austin area, i.e. - construction) in nature and have grown significantly to support Austin's incredible population/ basic employment growth over the past 15 – 20 years. Austin's population has more than doubled since 2003. I've highlighted (in the above chart) the basic industries of Austin that are primarily exporting products or services and bringing money into the local economy. Here are some specific corporate examples of each basic industry in Austin:

42. Wholesale Trade – Austin is a leader in semiconductor, electronics R&D and manufacturing, next generation automotive engineering and manufacturing (example is Tesla headquarter relocation to Austin), and clean technology including solar. Applied Materials is another major employer.

51. Information – the growth of the technology industry within the Austin area makes this the largest basic industry by category within Austin (highest location quotient). Companies include AMD, Amazon, Apple Dell, Meta Platforms, Google, IBM, Intel, Microsoft, Oracle, Qualcomm, Samsung, Silicon Laboratories, SpaceX, and Tesla. Oracle and Tesla recently relocated their headquarters to Austin within the past 5 years and Apple is building a $1 billion campus in north Austin.

52. Finance and insurance – many national finance & insurance companies have significant employment bases in Austin including Charles Schwab, Northwestern Mutual, and Progressive Insurance.

53. Real estate and rental leasing – although there are many companies in this category supporting the local Austin economy, there are many national real estate firms operating their primary operations in Austin. For example, Keller Williams has their headquarters in Austin as well as VRBO. There are also many national development, brokerage, and real estate services companies with significant footprints in the Austin area.

54. Professional and technical services – the State of Texas is the largest employer in the Austin area with a workforce of more than 63,000 people. This category also includes many research and development positions through state sponsored agencies and The University of Texas at Austin. Other major employers within this category include Accenture (management consulting) and Deloitte (accounting & related services).

55. Management of companies and enterprises – This category includes executive search companies and other corporate & regional managing offices. One of the largest employers in this category is Indeed, the online job search website, which has their corporate headquarters in Austin.

Below are calculation of Austin's current nominal basic employment, economic base multipliers, and population employment ratio:

2022 Basic Employment

2022 Employment Estimate (Bureau of Labor Statistics)								
NAICS Code	Industry Sector	Austin MSA	Local Percent (e)	United States	National Percent (E)	Location Quotients	(LQ-1)/LQ	Basic Employees
11	Agriculture, forestry, fishing and hunting	1350	0.0013	1,262,170	0.0089	0.1461		
21	Mining, quarrying, and oil and gas extraction	3103	0.003	555,956	0.0039	0.7692		
22	Utilities	2,906	0.0028	810,850	0.0057	0.4912		
23	Construction	74,984	0.0730	7,889,156	0.0553	1.3201	0.2425	18,182
31-33	Manufacturing	69,535	0.0677	12,809,405	0.0898	0.7539		
42	Wholesale trade	48,571	0.0473	5,977,132	0.0419	1.1289	0.1142	5,546
44-45	Retail Trade	114,138	0.1111	15,537,613	0.1090	1.0193	0.0189	2,161
48-49	Transportation and warehousing	30,617	0.0298	7,360,629	0.0516	0.5775		
51	Information	45,596	0.0444	3,182,631	0.0223	1.9910	0.4977	22,695
61	Educational services	21,089	0.0205	12,564,903	0.0881	0.2327		
62	Health care and social assistance	115,998	0.1129	22,317,076	0.1565	0.7214		
71	Arts, entertainment, and recreation	15,199	0.0148	2,616,288	0.0183	0.8087		
52	Finance and insurance	48,028	0.0468	6,292,480	0.0441	1.0612	0.0577	2,770
53	Real estate and rental leasing	24,895	0.0242	2,379,748	0.0167	1.4491	0.3099	7,715
54	Professional and technical services	149,515	0.1456	10,654,099	0.0747	1.9491	0.4869	72,805
55	Management of companies and enterprises	21,534	0.0210	2,503,466	0.0176	1.1932	0.1619	3,487
56	Administrative and waste services	80,720	0.0786	9,619,981	0.0675	1.1644	0.1412	11,397
72	Accomodation and food services	120,644	0.1175	13,512,345	0.0948	1.2395	0.1932	23,311
81	Other services, except public administration	37,651	0.0367	4,441,275	0.0311	1.1801	0.1526	5,746
99	Unclassified	1,045	0.0010	295,426	0.0021	0.4762		
Totals		1,027,118	1.0000	142,582,629	1.0000	1.0000		**175,815**

Total basic employment as of the year-end 2022, is estimated to be 175,815 based on industries with location quotients greater than 1.

Economic Base Multipliers

BLS would only allow data back to 2018 and was missing key categories in Austin for NAICS categories of Information (51), Professional and technical services (54), and Management of companies and enterprises (55). I assumed the location quotients were similar to 2022 for 2018 for these categories and calculated 2018 total and basic employment.

2018 & 2022 Employment Estimate for Austin MSA (Bureau of Labor Statistics)					
NAICS Code	Industry Sector	2018 Total Employment	2022 Total Employment	2018 Basic Employment	2022 Basic Employment
11	Agriculture, forestry, fishing and hunting	1,053	1350		
21	Mining, quarrying, and oil and gas extraction	3,801	3103		
22	Utilities	2,281	2,906		
23	Construction	59,612	74,984	13,275	18,182
31-33	Manufacturing	60,175	69,535		
42	Wholesale trade	46,356	48,571	9,723	5,546
44-45	Retail Trade	105,664	114,138	6,421	2,161
48-49	Transportation and warehousing	19,279	30,617		
51	Information	31,321	45,596	12,840	22,695
61	Educational services	17,629	21,089		
62	Health care and social assistance	102,490	115,998		
71	Arts, entertainment, and recreation	14,102	15,199		
52	Finance and insurance	40,836	48,028	3,303	2,770
53	Real estate and rental leasing	19,878	24,895	5,642	7,715
54	Professional and technical services	112,250	149,515	53,477	72,805
55	Management of companies and enterprises	17,498	21,534	2,859	3,487
56	Administrative and waste services	63,360	80,720	5,034	11,397
72	Accomodation and food services	115,789	120,644	28,559	23,311
81	Other services, except public administration	34,812	37,651	6,424	5,746
99	Unclassified	0	1,045		
Totals		868,186	1,027,118	147,557	175,815

Static Base Multiplier for Austin MSA	Dynamic Base Multiplier for Austin MSA
5.8420	**5.6243**
2022 Total Employment (1,027,118)/2022 Basic Employment (175,815) = Static EBM (5.8420)	(2022 TE - 2018 TE (1,027,118-868,186))/(2022 BE - 2018 BE (175,815-147,557)) = Dynamic EBM (5.6243)

The static base multiplier in 2022 of 5.842 represents that every basic job in Austin supports and additional 4.842 jobs in non-basic sectors. So for every 100 basic jobs brought into Austin, non-basic employment would growth by 484 jobs. The dynamic reflects the same relationship but shows the trend from 2018 to 2022. The static base multiplier is higher than the dynamic base multiplier which shows that Austin is currently adding more non-basic employment per each basic job created than the past 3-year trend.

Population to Employment Ratio

Austin MSA Population in 2022	Population Employment Ratio
2,176,000	**2.1185**
	2022 Total Population (2,176,000)/2022 Total Employment (1,027,118) = Population Employment Ratio (2.1185)

Works Cited

Quarterly Census of Employment and Wages (bls.gov)

Major Employers | Austin Chamber of Commerce

Key Industries | Austin Chamber of Commerce

Austin Metro Area Population 1950-2021 | MacroTrends

15 Big Tech Companies In Austin, TX | Move To Austin

The top industries and employers in the Austin metro area - ATDtoday (kxan.com)