Promise and Perils of an Accelerated Economy

Bay Area Economic Profile
Ninth in a Series

May 2016

BAY AREA COUNCIL ECONOMIC INSTITUTE

About the Bay Area Council Economic Institute

Since 1990, the Bay Area Council Economic Institute has been the leading think tank focused on the economic and policy issues facing the San Francisco/Silicon Valley Bay Area, one of the most dynamic regions in the United States and the world's leading center for technology and innovation. A valued forum for stakeholder engagement and a respected source of information and fact-based analysis, the Institute is a trusted partner and adviser to both business leaders and government officials. Through its economic and policy research and its many partnerships, the Institute addresses major factors impacting the competitiveness, economic development, and quality of life of the region and the state, including infrastructure, globalization, science and technology, and health policy. It is guided by a Board of Trustees drawn from influential leaders in the corporate, academic, non-profit, and government sectors. The Institute is housed at and supported by the Bay Area Council, a public policy organization that includes hundreds of the region's largest employers and is committed to keeping the Bay Area the world's most competitive economy and best place to live. The Institute also supports and manages the Bay Area Science and Innovation Consortium (BASIC), a partnership of Northern California's leading scientific research laboratories and thinkers.

About This Report

This report, the ninth in a series of Bay Area Economic Profile reports produced since 1997 by the Bay Area Council Economic Institute and McKinsey & Company, examines the region's economy as it has emerged from the Great Recession to enter a new period of growth and innovation. As previous reports have done, it benchmarks the Bay Area's performance against other knowledge-based economies to assess the region's national and global competitiveness. It also examines the economic and policy challenges that continue to confront the region even in a period of extraordinary growth.

Acknowledgments

This Economic Profile report was prepared on a pro bono basis by McKinsey & Company in partnership with the Bay Area Council Economic Institute. It is the product of extensive analysis by the McKinsey team, research and management by the Economic Institute, and input from regional leaders.

Alex Maasry and Kausik Rajgopal led the effort for McKinsey with support from Zachary Kubetz and Andres Monge. Sean Randolph and Micah Weinberg led an Institute team that included Jeff Bellisario, Patrick Kallerman, and Camila Mena.

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Executive Summary

It has been over eight years since the onset of the Great Recession, and we are in the midst of one of the longest periods of consecutive jobs and output expansion in the history of the Bay Area. Since the middle of 2009, the region has posted consistent, strong growth in every quarter.

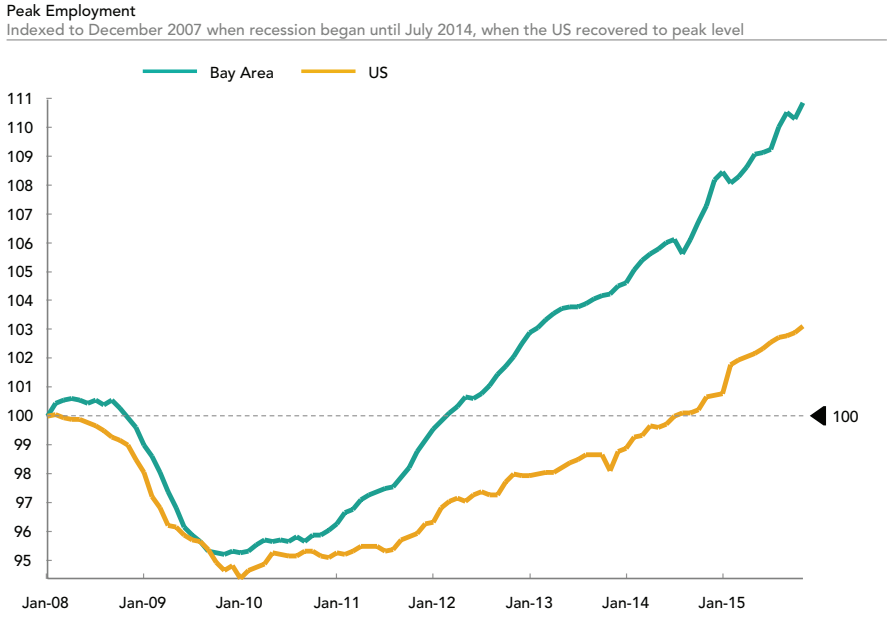
In contrast to its slow recovery following the dot-com crash, the Bay Area has recovered much faster than the rest of the country. The nation did not return to its pre-recession employment peak until early 2014, but the Bay Area reached its peak by the end of 2011. By the end of 2015, the region's absolute employment level was more than 10% higher than at the height of the last economic cycle (Exhibit 1).

But there are storm clouds on the horizon. The question is not whether we will experience another recession, but how significant the economic contraction will be in the Bay Area compared with the rest of the nation and the world. Will it be as short as it was in the recovery from the Great Recession or as severe as it was in the wake of the dot-com crash?

Equity considerations must inform our outlook as well. The phenomenal regional run-up in wealth has not been shared by all, and poverty in the region has actually increased during the recovery. How can we leverage the Bay Area's many strengths to sustain economic success across business cycles and promote more prosperity?

Exhibit 1

Bay Area jobs recovery vs. the United States



1 Top 25 cities by December 2007 employment. Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
SOURCE: BLS, Moody's Analytics

A DIVERSE, RESILIENT ECONOMY

The typical narrative behind the Bay Area's strong recovery is that it is largely tech-sector led, and it is certainly true that tech has grown and Silicon Valley is booming once again, powered by unparalleled financial resources that support peerless innovation. The Bay Area's share of US venture capital funding is higher than it has ever been and patents per capita vastly outnumber peer regions. The number of "unicorns"—start-ups with valuations over $1 billion—has multiplied, though some have recently stumbled.

The data shows, however, that the Bay Area's economy is now rooted in a diverse, competitive industry set. Whereas peer regions such as New York City and Houston tend to have their largest companies focused in one sector (e.g., finance and energy, respectively), the Bay Area has companies distributed across all major sectors (Exhibit 2).

In addition, the traditional lines between technology and other sectors are blurring. Technology is transforming industries such as finance, accommodations, and transportation through companies such as SoFi, AirBnB, and Lyft. Unlike many of the technology firms of the dot-com era whose business models relied on internet advertising revenue, today's technology companies often generate revenue early in their life cycles and appear to be on more solid financial footing. They are producing regional wealth and driving job growth in a fundamentally different way. The region is also home to three of the world's most valuable companies—Apple; Google's parent company, Alphabet; and Facebook—all of which are likely to endure for decades as major engines of economic growth.

Exhibit 2

The Bay Area is diversified across top performing companies compared to peers

Fortune 500 Companies by Industry Sector

	Consumer Discretionary/Media	Energy & Utilities	Financials	Information Technology/ Telecommunications	Health	Others
New York	21st Century Fox, CBS, Viacom, PVH, Ralph Lauren, Coach, Barnes & Noble, Foot Locker, Estée Lauder, Avon, Colgate-Palmolive, Kellogg	conEdison, Hess	JPMorgan Chase & Co., Citigroup, AIG, INTL FCStone, Guardian, Morgan Stanley, American Express, TIAA-CREF, Goldman Sachs, MetLife, Assurant, New York Life, BNY Mellon, BlackRock, The Blackstone Group, Travelers, KKR, Alleghany	Verizon, Time Warner Cable, CenturyLink	Pfizer, Bristol-Myers Squibb	McGraw Hill, Alcoa, OmnicomGroup, ICANN, IPG, Harbinger Group Inc., Loews
Houston	Sysco, Group 1 Automotive	ConocoPhillips, Phillips 66, Plains GP Holdings, Enterprise Products Partners L.P., Halliburton, NOV, Apache, EOG Resources, Spectra Energy, Targa, Kinder Morgan, Cameron, Noble Energy, FMC Technologies, Calpine, Marathon Oil				MRC Global, Quanta Services, Waste Management, KBR
Bay Area	Clorox, Ross, Core-Mark, Safeway, Gap	PG&E, Chevron	Wells Fargo, Franklin Resources, Inc., Charles Schwab, Visa	Google, HP, Cisco Systems, Oracle, Symantec, Xerox, eBay, NetApp, SanDisk, Applied Materials, Sanmina-SCI, Intel, AMD	Gilead, Agilent Technologies, McKesson	

SOURCE: Fortune, Capital IQ, McKinsey analysis

CHALLENGES TO SUSTAINED GROWTH

This run-up in jobs and income growth, however, brings with it many challenges. In many ways, it is exacerbating longstanding issues such as transportation congestion and lack of affordable housing. In prior economic profiles, we contended that as long as the Bay Area maintained its productivity edge, the region would remain globally competitive and would be able to prosper. Underpinning this logic is the notion that productivity gains would be broadly shared, either directly through employment or indirectly through increased demand for supporting services. Yet over the past 15 years, the average wage in the Bay Area has remained largely flat in real terms while productivity has increased over 20% (Exhibit 3).

The question is not whether we will experience another recession, but how significant the economic contraction will be in the Bay Area compared with the rest of the nation and the world.

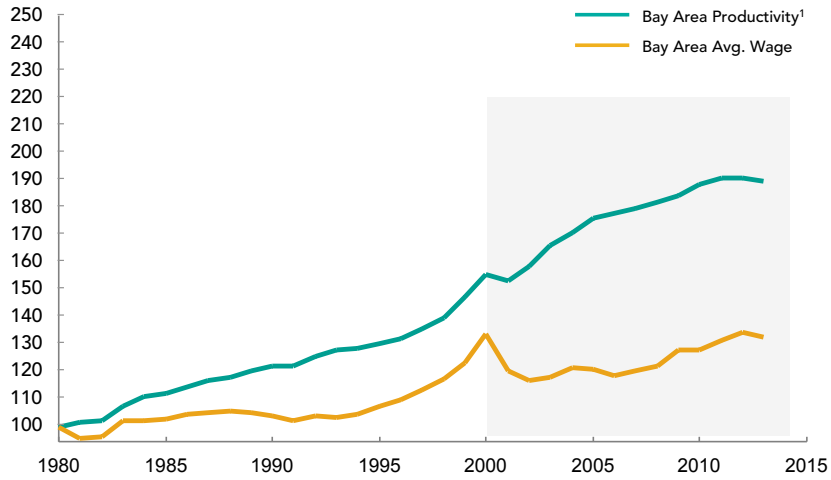
This widening gap has led to the point where the "premium" we get for being more productive than peer regions is more than offset by our high cost of living. In San Jose, for example, the difference between the local cost of living and the national average is greater than the difference between average local and national wages. And workers who do not participate in the Bay Area's "knowledge economy" often make much less than the region's average wage.

We write this not to sound alarmist or to take away from the region's glowing success. Rather, our focus is on how we can manage this success and ensure that the new economy works for everyone. We cannot ignore our perennial problems in infrastructure, education, and housing. We also need new tools and perspectives to manage a rapidly changing 21st century economy. Success requires innovations not only in technology, but in healthcare delivery, education-to-employment pathways, and other policies and practices that will sustain regional success and a high quality of life in the long run.

Exhibit 3

The Bay Area average wage has lagged productivity growth over the past 15 years

Relationship between income and productivity,
Index



1 Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
SOURCE: Moody's Analytics, BEA, BLS

1

The Bay Area is as Strong as Ever

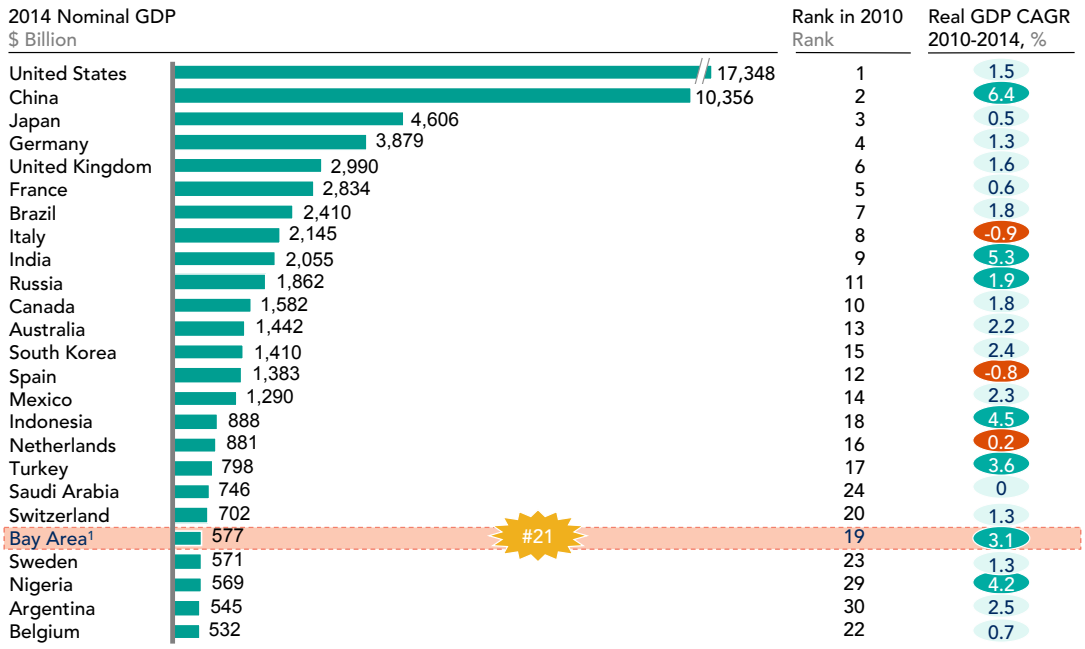
As the United States completes its seventh year since the Great Recession, the Bay Area continues to be as strong as ever. A quick recovery, resilient economic diversity, and a burgeoning innovation and technology sector have made the Bay Area perhaps the most dynamic growth economy in the developed world.

A simple starting point is the sheer size of the economy: the Bay Area remains one of the world's largest economies, and if it were a country, it would be the 21st largest (Exhibit 4), equivalent to a midsized European nation.

This economic strength is derived not just from the size of the Bay Area but also from its creativity and resilience, which was reflected in its rapid recovery from the Great Recession. Bay Area GDP growth has outpaced that of the US in every quarter since 2010, with a compounded annual growth rate of 3.1%, more than double that of a group of peer regions that includes New York, Los Angeles, Austin, Boston, Seattle, and San Diego (Exhibit 5).

Exhibit 4

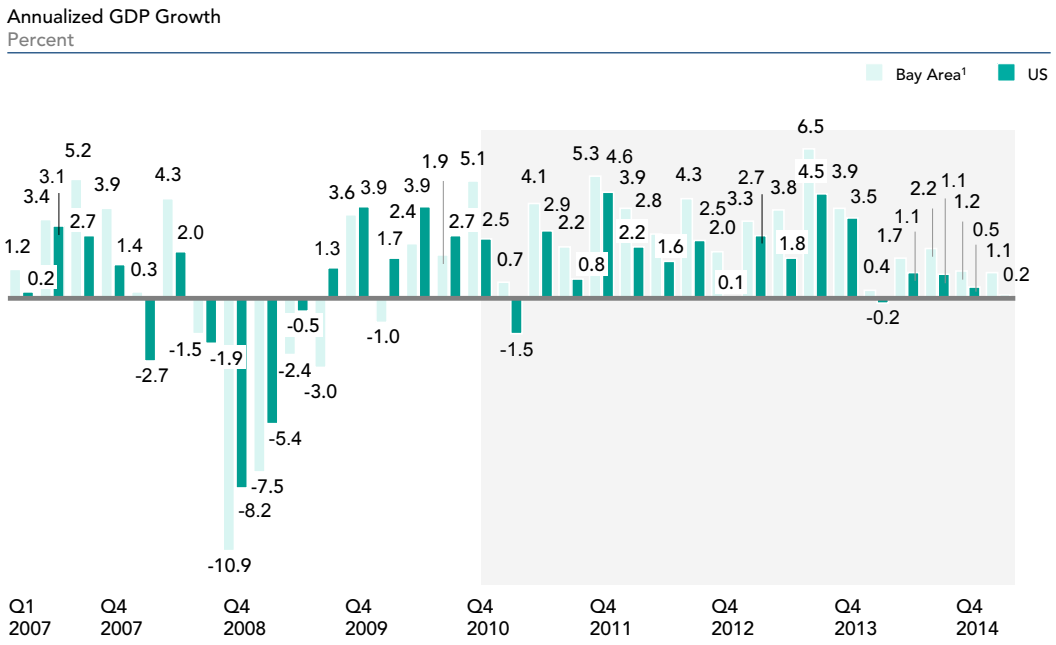
The Bay Area is the 21st largest economy in the world



1 Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
SOURCE: Global Insight, Bureau of Economic Analysis, Moody's, McKinsey analysis

Exhibit 5

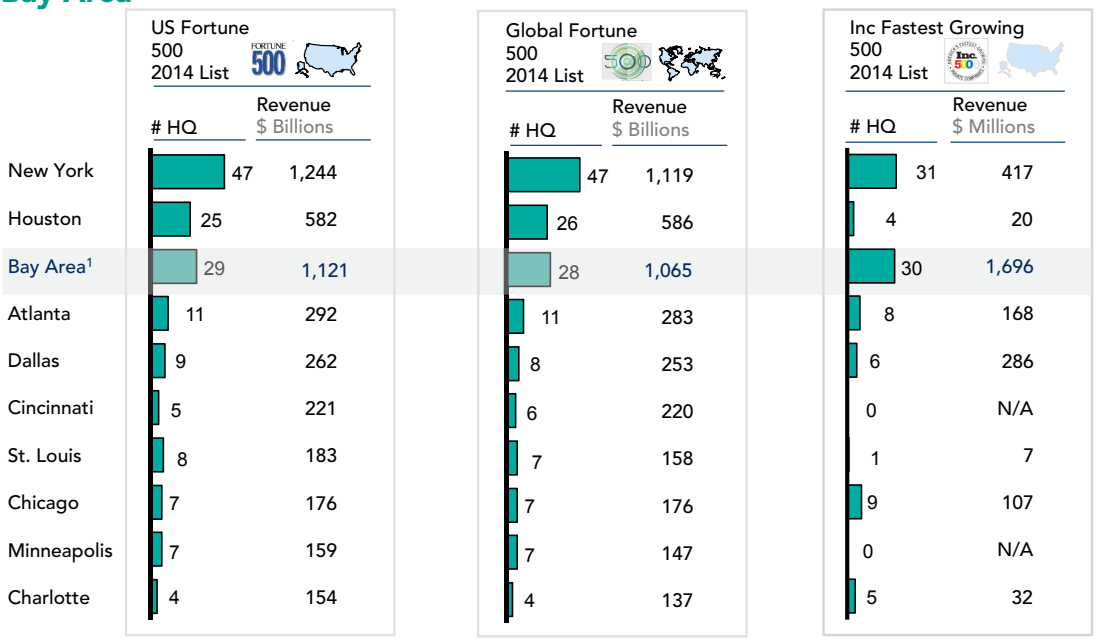
Bay Area GDP growth has outpaced that of the US since Q4 2010



1 Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
SOURCE: Moody's Analytics

Exhibit 6

Many of the largest and fastest growing global companies are based in the Bay Area



1 Includes five core regional MSAs
SOURCE: Fortune magazine, Inc 500, McKinsey analysis

Over the same period, Bay Area employment has been even stronger, growing at a compound annual rate of 3.4%, more than 50% faster than its peers' 2.0% growth rate. To put this in context, by the time the country as a whole returned to pre-Great Recession peak employment, the Bay Area already employed 6% more people than it had before the recession. Unlike much of the rest of the country, the Bay Area has not experienced a "jobless" recovery. It has outpaced the country in both income and job growth.

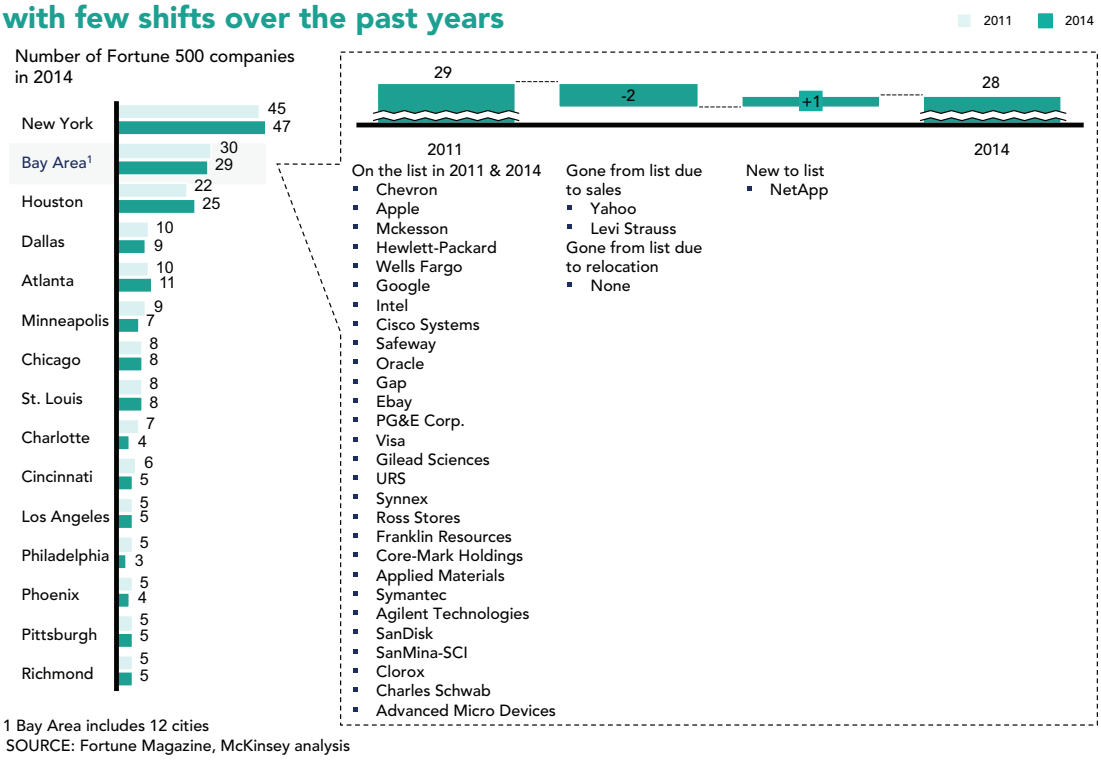
Bay Area GDP growth has outpaced that of the US in every quarter since 2010, with a compounded annual growth rate of 3.1%, more than double that of a group of peer regions, including New York, Los Angeles, Austin, Boston, Seattle, and San Diego.

This macroeconomic resilience has been fueled by some of the largest and fastest-growing companies in the US who continue to make the Bay Area home. Twenty-eight of the global Fortune 500 and 29 of the US Fortune 500 are headquartered locally (Exhibit 6). Both of these groups represent more than $1.0 trillion in sales. Since 2011, no Fortune 500 companies have left the Bay Area, and a new entrant, data management and cloud services provider NetApp, has joined the list (Exhibit 7). Beyond large companies, the Bay Area is home to 30 of the Inc. Fastest Growing 500 list, collectively accounting for approximately $1.7 billion in sales. The Bay Area is also home to three of the top 10 global companies ranked by market capitalization, including the two most valuable companies in the world, Apple and Alphabet (Google) (Exhibit 8).

A growing economy and a robust tourism sector are driving connections through the region's airports, which provide one way to measure economic activity as residents, business travelers, and visitors arrive and depart. In 2015, SFO served a record 50 million passengers, with the highest rate of growth for international passengers of any airport in the nation. In the last three years, 13 new airlines have initiated service to or from SFO, with more expected in 2016.

Exhibit 7

The Bay Area is home to the 2nd largest number of Fortune 500 companies with few shifts over the past years



1 Bay Area includes 12 cities
SOURCE: Fortune Magazine, McKinsey analysis

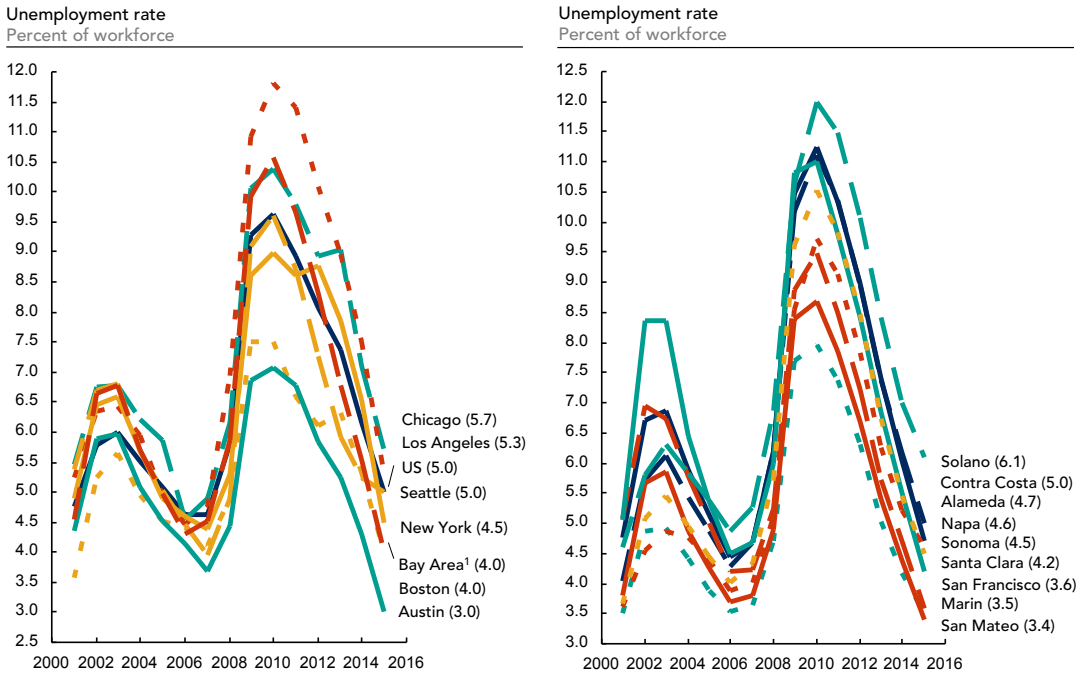
Exhibit 8

The Bay Area is home to three of the top 10 global companies

SOURCE: Bloomberg and PwC analysis

Exhibit 9

Unemployment rates reflect a strong demand for labor



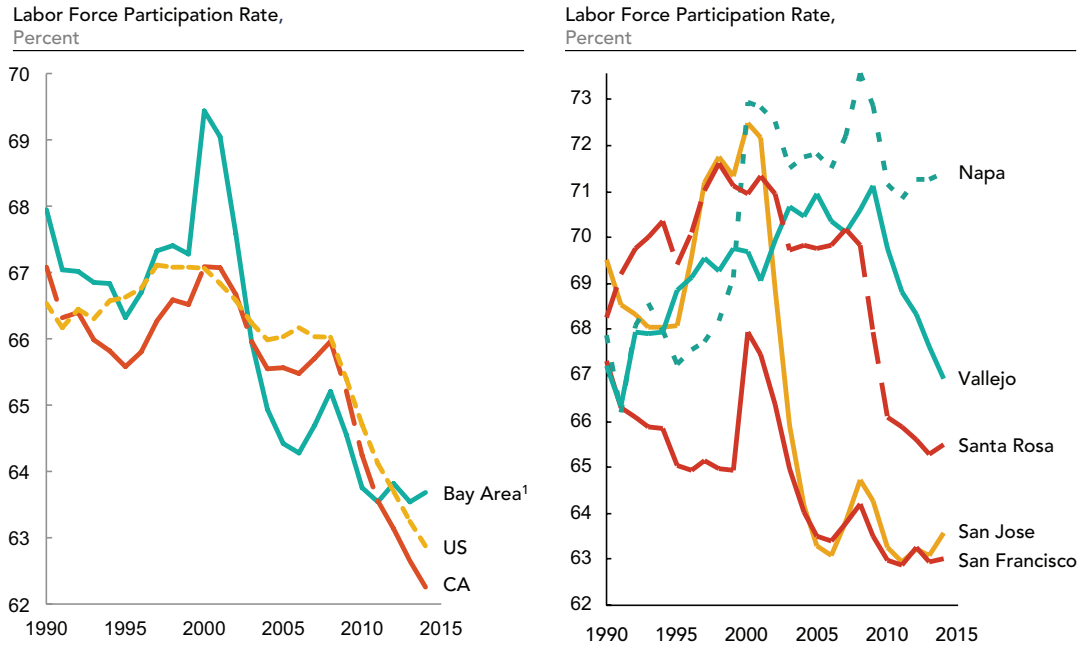
1 Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
SOURCE: BEA, BLS, Moody's Economy.com, McKinsey analysis

HELP WANTED

As jobs return to the Bay Area, the broad employment picture has continued to improve. The unemployment rate in the Bay Area (4.0% as of December 2015) is lower than most peer cities (Exhibit 9). More interesting is a look at the labor force participation rate. While labor force participation across the country has fallen significantly over the past few years and is currently near 50-year lows, the Bay Area's labor force participation has held steady at approximately 64% since 2010 (Exhibit 10). Nationally, labor force participation—or the lack thereof—has been a damaging impact of the Great Recession, since the longer discouraged workers stay out of work the harder it becomes for them to re-enter the labor force. The Bay Area's quick recovery seems to have shielded the region from as steep a drop as the rest of the country, further mitigating the recession's impacts.

Exhibit 10

The Bay Area labor force participation rate has steadied



1 Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
SOURCE: CPS March 2011 supplement, McKinsey analysis

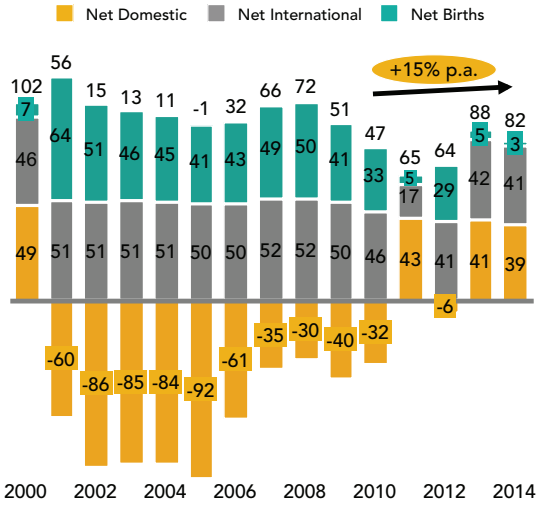
Strong demand for labor has translated into improving regional demographics and an improved supply of labor. Since 2010, the Bay Area population has grown at a 15% compound annual rate (Exhibit 11). Whereas domestic migration has in the past been a drag on overall population growth, for the first time since 2000 more people are moving to the Bay Area from other states than are leaving. This is attributable to the broader availability of jobs and the draw of the region's technology-driven economy. Skilled workers from around the country and around the world continue to flock to the region.

Beyond the demand and supply of labor, the quality of labor in the Bay Area continues to trump that of peer regions. For example, educational attainment levels in the Bay Area, measured as the share of the population aged 25 and older with a bachelor's degree, are higher than in all other peer regions (Exhibit 12). According to US Census data, the percentage of those born in their home state with a bachelor's degree is also higher in San Francisco and San Jose than in New York, Boston, or Los Angeles, meaning that the Bay Area continues to produce a significant portion of its talent from within.

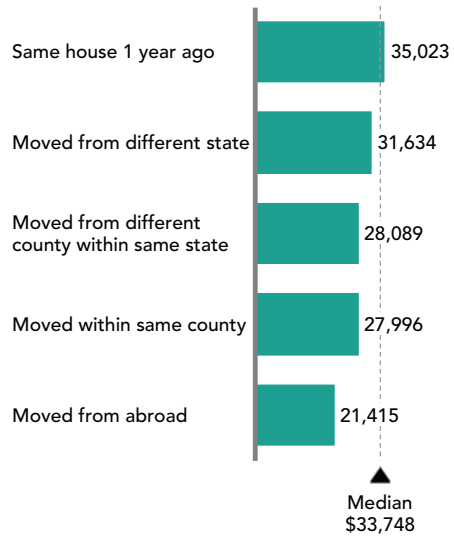
Exhibit 11

Net domestic migration has turned positive

Bay Area[1] population change, 000s



2013 median income by migration[2], $



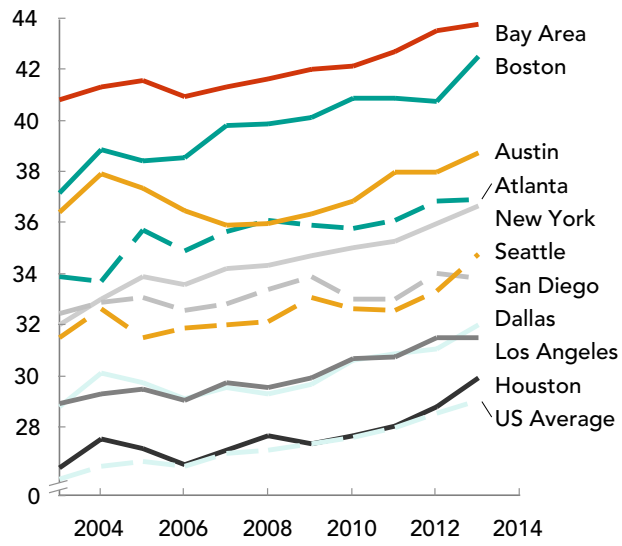
1 Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
2 Bay Area combined statistical area data

SOURCE: California Department of Labor, ACS 5-year estimates

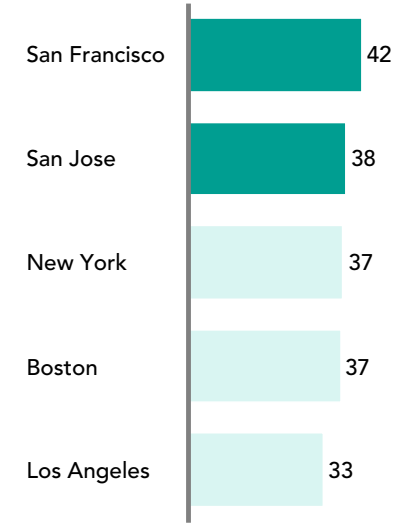
Exhibit 12

The Bay Area's population continues to be more educated than all US peer cities

Bay Area[1] educational attainment against peer regions, Percent w/ bachelor's age 25+



2013 Percent of those w/ bachelor's born in home state, Percent



1 Data is at the MSA level, includes San Jose, San Francisco, Napa, Santa Rosa and Vallejo
SOURCE: Moody's Analytics, ACS

UNWAVERING INNOVATION

The Bay Area innovation engine continues to run at high speed, driving growth across the economy.

University R&D remains high, as the Bay Area has four universities ranked in the top 25 US institutions by R&D investment (Exhibit 13). In 2015, UC San Francisco won $560.4 million in National Institutes of Health funding, placing it second in the nation only to Johns Hopkins. Three Bay Area institutions are in the top 25 for earned doctorates, with UC Berkeley producing the most doctoral students in the country. Looking at human capital through the lens of entrepreneurship, Stanford and Berkeley alone have produced entrepreneurs receiving approximately $9.5 billion in venture funding and helping to found more than 850 companies since 2009 (Exhibit 14).

The Bay Area produced about 20% more patents in 2013 than it did in 2010. Reflecting this, the US Patent and Trademark Office opened an office in San Jose in 2015, one of only four outside Washington, DC.

The Bay Area also differentiates itself in the production of intellectual property (Exhibit 15). In 2013, the most recent year for which regional data is available, the Bay Area produced more than 21,000 utility patents, equivalent to over 3,000 per million inhabitants, representing more than 16% of all patents granted annually in the country. In fact, the Bay Area produced about 20% more patents in 2013 than it did in 2010. Reflecting this trend, the US Patent and Trademark Office opened an office in San Jose in 2015, one of only four outside Washington, DC.

Exhibit 13

Leading regional universities are responsible for a significant share of US R&D investment and doctoral degrees

Total public and private Science & Engineering R&D investments at US universities and colleges, 2013-2014, with graduate rankings

Regional university	Rank in R&D expenditures[1] 2014	Rank in earned doctorates 2014	Rank in FTGS[2] 2014
UC San Francisco	5	119	152
Stanford University	9	10	5
UC Berkeley	23	1	9
UC Davis	25	24	31
UC Santa Cruz	123	103	130

- The Bay Area has four universities ranked in the top 25 US institutions by R&D expenditures
- Moreover, three of its institutions are in the top 25 for earned doctorates

1 Based on estimates from an annual census of institutions that expended at least $150,000 in separately budgeted R&D in the fiscal year
2 Full-time graduate students
SOURCE: National Science Foundation, Division of Science Resources Statistics – HERD Survey

Exhibit 14

The Bay Area produces some of the most entrepreneurial undergraduates in the world

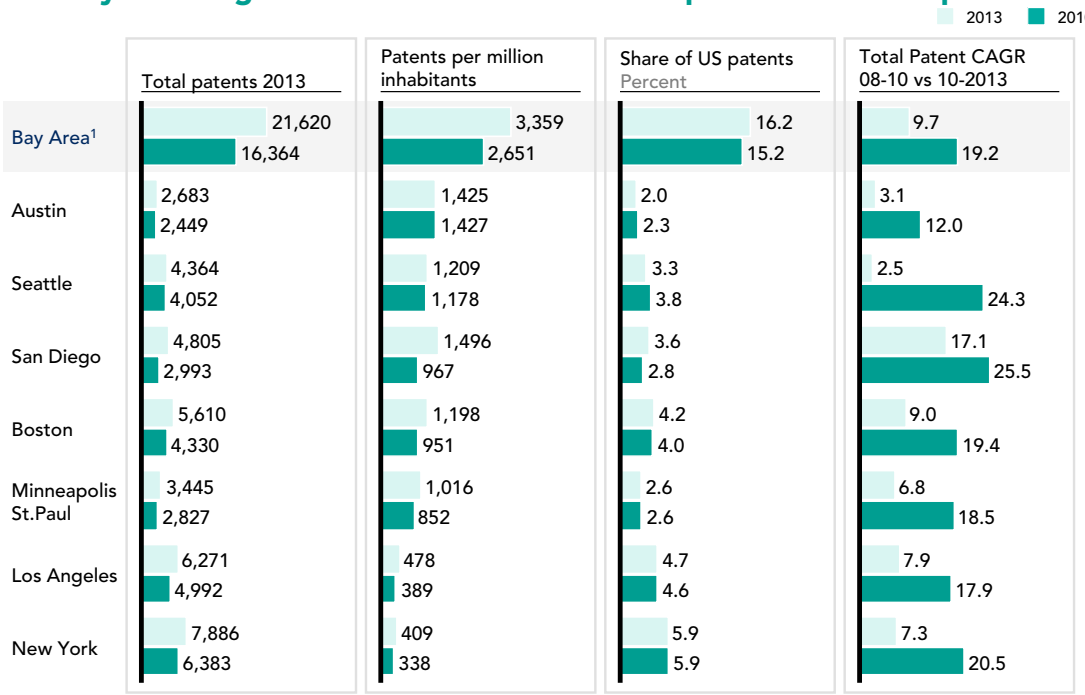
Undergraduate ranking[1]	Entrepreneur count #	Company count #	Capital raised $ Bil	VC backed companies
1 Stanford	378	309	3.5	One Kings Lane, Digital Sky Technologies, Flipboard, Okta, Snapchat
2 UC Berkeley	336	284	2.4	One Kings Lane, Warby Parker, Playdom, Quixey, Calithera Biosciences
3 MIT	300	250	2.4	Oscar Health Insurance, Xamarin, Avere Systems, Human Longevity
4 Indian Institute of Tech	264	205	3.2	Coupang, Quora, Adaptive Biotechnologies, zulily, Blu Homes
5 Harvard	253	229	3.2	Flatiron Health, Spark Therapeutics, Wheels Up, PeixeUrbano, Inspirato
6 University of Pennsylvania	244	221	2.2	Wayfair, Adaptive Biotech, Kilowatt Financial, Urban Compass, Accolade
7 Cornell	212	190	2.0	Snapdeal, Hortonworks, Nutanix, NextNav, Sumo Logic
8 University of Michigan	176	158	1.2	Nest Labs, Medallia, Sympoz, eFFECTOR Therapeutics, AdKeeper
9 Tel Aviv University	169	141	1.3	Houzz, Mobli Media, Primary Data, Zerto, Owilt
10 University of Texas	150	137	1.3	Jade eServices, Calxeda, Hotel Tonight, Skyonic, mcl0

MBA ranking	Entrepreneur count #	Company count #	Capital raised $ Bil	VC backed companies
1 Harvard	352	312	4.2	Arava Power, Linio, Oscar Health Ins., Kolltan Pharmaceuticals, Dermira
2 Stanford	226	201	2.9	Fab, Social Finance, Harry's Razor Company, zulily, Funding Circle
3 University of Pennsylvania	194	169	2.2	NextNav, Harry's Razor Co., Adaptive Biotech, Warby Parker, ZestFinance
4 MIT	131	110	0.8	Okta, HelloFresh, mc10, Agile Energy, Synchroneuron
5 Northwestern	111	102	1.5	Roka Bioscience, Zalando, Edmodo, Urban Compass, Betterment
6 Columbia	110	103	1.1	Lazada, Westwing Home & Living, Wilocity, Hotel Tonight, The Iconic
7 INSEAD	99	92	1.2	Comercio Digital BF, Houzz, Cormuto, Belltown Power, Apttus
8 University of Chicago	94	83	1.4	ISI Tech., Juno Therapeutics, Neos Therapeutics, Braintree, Spredfast
9 UC Berkeley	78	68	0.7	The Iconic, Avalanche Biotech, Sympoz, Netskope, Indiegogo
10 UCLA	65	63	0.9	One Kings Lane, Liq. Env. Sol.,The Honest Co., Radiology Part. Sunpreme

1 Ranking based on analysis of data from 2009-current date of VC backed companies based on education of founder(s)
SOURCE: Pitchbook 2014 report

Exhibit 15

The Bay Area region remains at the head of its peers in terms of patents



1 Data for San Francisco and San Jose MSAs
SOURCE: US Patent and Trademark Office, US Census Bureau, McKinsey analysis

VENTURE CAPITAL FUELS STARTUP GROWTH

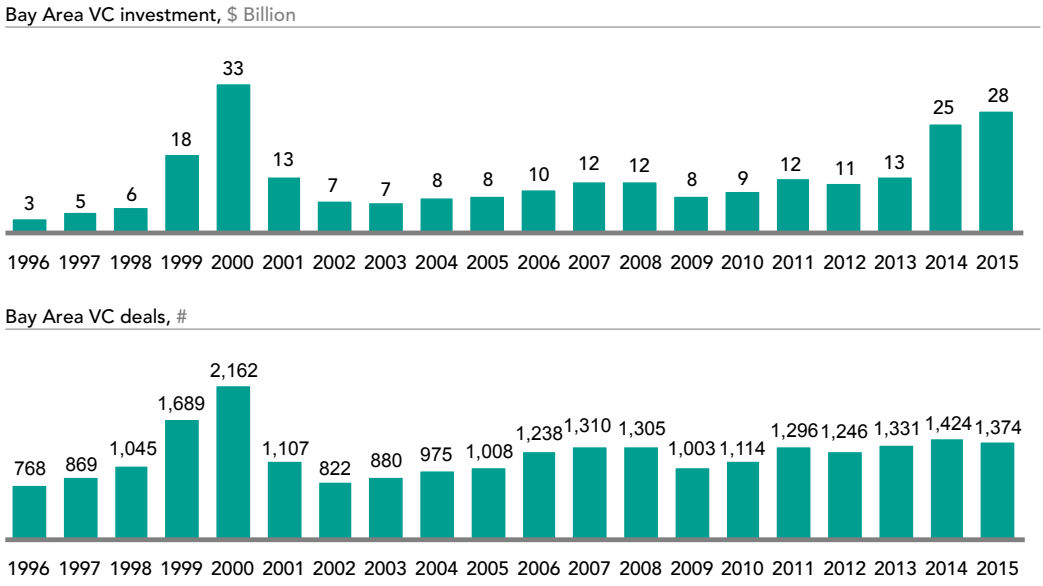
While venture capital (VC) flows are smaller than 15 years ago during the dot-com boom (when they were extraordinarily high and ultimately unsustainable), they continue to be large. Since 2010, Bay Area VC investment has increased at a compound annual growth rate of 25%.

The region's competitive positioning within the larger landscape of venture capital continues to be dominant. In 2015, the Bay Area garnered 46.5% of total VC flows in the United States, translating to nearly $28 billion of investment and over 1,300 deals (Exhibits 16, 17, 18). The Bay Area was home to 85% of all California VC investment and was home to more larger, later stage deals. On average, Series C deals were $9 million more and Series D deals $16 million more than those of the US as a whole (Exhibit 19). The economic leverage that this venture investment affords is increased when funding from other sources of risk capital such as angel investment and private equity is added.

This is significant, as for years, many observers have predicted that the Bay Area's innovation edge would deteriorate as other tech hubs around the country gained momentum and California's challenged business climate discouraged entrepreneurs from locating in the Bay Area. The data actually shows the opposite trend—an increasing share of venture capital dollars flowing to the Bay Area over time.

Exhibit 16

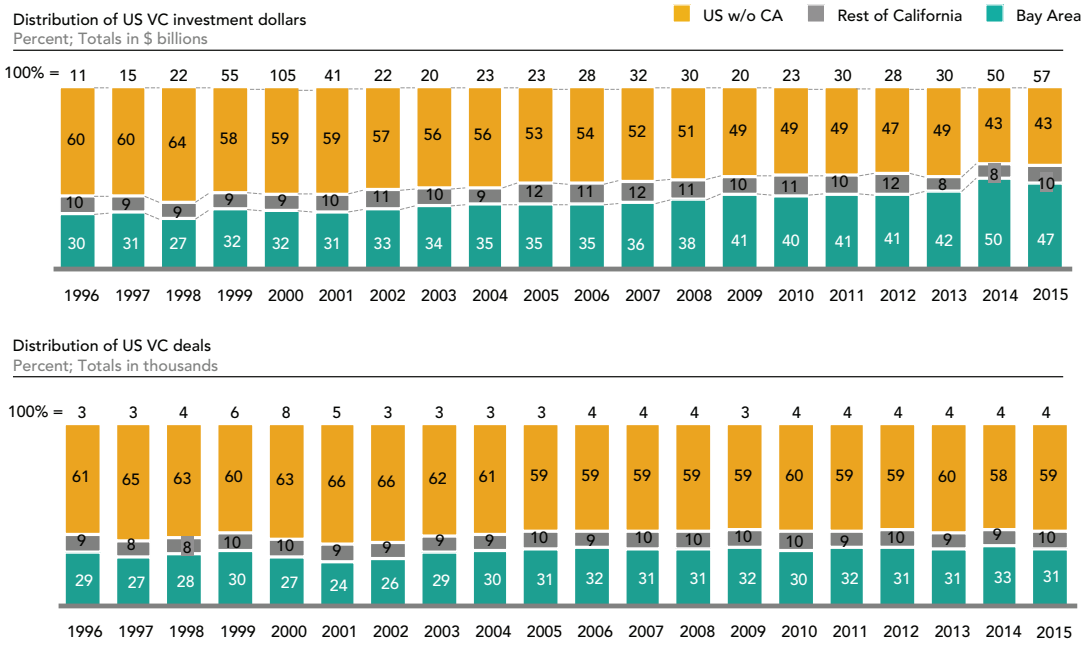
Venture capital flows into the Bay Area have been strong



SOURCE: PwC MoneyTree Report

Exhibit 17

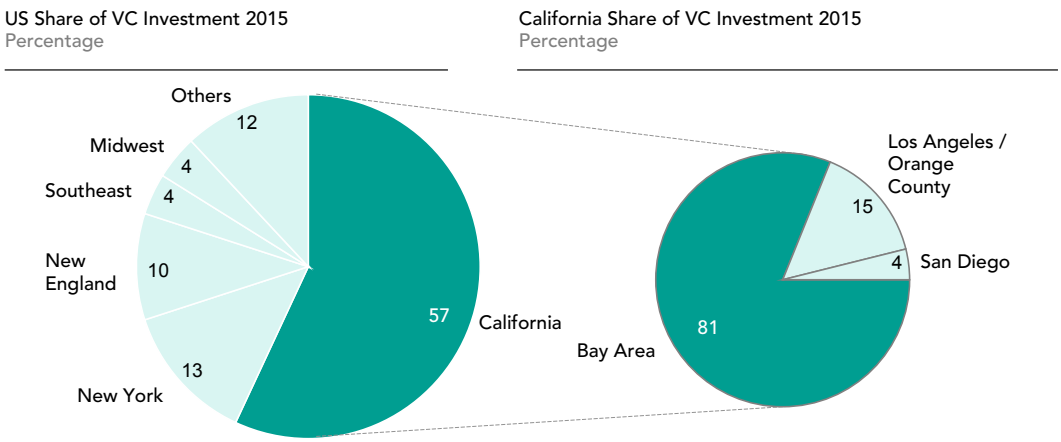
The Bay Area has captured more US VC investment dollars without a significant increase in the share of transactions



SOURCE: PwC Moneytree Report, McKinsey analysis

Exhibit 18

The Bay Area continues to dwarf other states and regions in venture capital investment attraction



- In 2015, over $34.2 billion was invested in California, which amounted to 57.3% of national venture capital funding
- In 2015, 46.5% of all VC funding in the US and 81.1% of all VC funding in California was invested within the San Francisco Bay Area
- The total funding to the San Francisco Bay Area in 2015 was approximately $27.8 billion

SOURCE: PwC MoneyTree Report

Spotlight on:

The Rise of Corporate Venture Capital

What is it?

- Corporate venture capital (CVC) involves the investment of corporate funds directly into external start-up companies. CVC is at its highest investment level in 10 years, representing $12.3 billion in overall 2014 investment, with participation in 15% of all venture capital deals.

Economic impact for the Bay Area

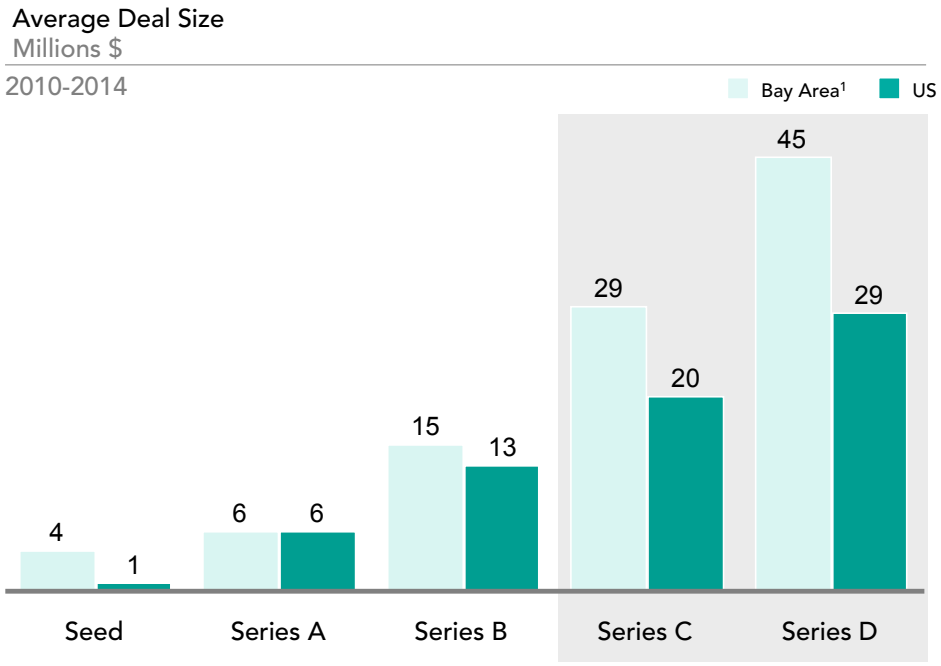
- Four of the top five CVC firms are based in the Bay Area, the largest being Google Ventures and Intel Capital. In 2014 alone, the Bay Area accounted for more than 200 deals totaling approximately $6 billion including deals with Uber, Cloudera, and Survey Monkey.
- Google and Intel have together invested in approximately 400 firms since 2011.

What are the different types of corporate VC activity?

- The next big thing (e.g., Google Ventures, Intel Capital): Independent arms designed to generate high financial returns through investments in companies that are in orthogonal or noncompeting sectors to the parent company. Investment in all stages of companies.
- Strategic initiatives (e.g., GE Ventures, Comcast Ventures): A coupled/decoupled corporate unit that accelerates initiatives and/or hedges against disruptive tech. Investment in later-stage companies.
- Incubator/accelerator/R&D (e.g., Amazon, Microsoft Accelerator): Incubator designed to advance specific R&D objectives, or get feedback on a product platform. Investment in events such as "hackathons" with prizes.
- Partnership with a VC fund (e.g., Felicis Ventures, Highland Capital Partners): Corporations investing in VC funds to as a way of having "first look" at upcoming companies. Range from $10 million to $100 million.

Exhibit 19

Bay Area VC invests more in later stage deals



1 Aggregate of 5 core MSAs: Napa, San Francisco, San Jose, Santa Clara, Vallejo
SOURCE: Pitchbook

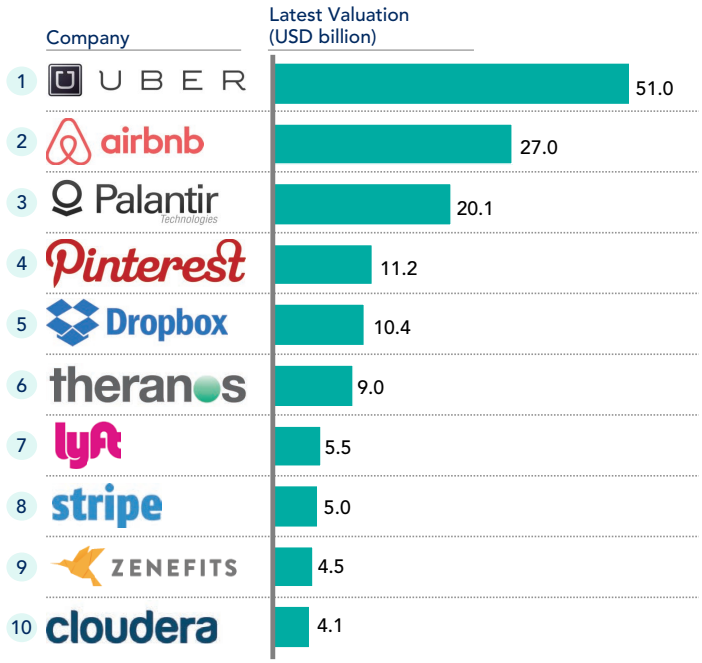
What is fueling the increased VC funding? Whereas fifteen years ago entrepreneurs often opted for IPO-backed exits in order to access the capital needed to grow, private markets are now providing richer, later-staged exits. In the Bay Area alone, there are numerous startups valued at more than $1 billion, otherwise known as "unicorns" (Exhibit 20). In fact, Uber, the mobile car-sharing app, is now valued higher than 80% of S&P 500 companies.

According to some estimates, there are 587 tech startups that have the momentum to go public in the next several years (Exhibit 21). More than 40% of these startups received their first financing round after 2010, and over 50% are from California. Assuming that tech VC follows the same regional VC trend, that translates to over 250 tech startups from the Bay Area alone that could go public.

It is important to note that the number of IPOs in a given year is influenced by investment cycles and whether public equity markets are strong or weak. As of early 2016, valuations of many unicorns are under pressure, and the accelerated investment witnessed in the last several years is showing signs of cooling. Nevertheless, a correction of this kind can be healthy, and the dynamic companies that are created and survive will continue to lead and disrupt markets. Whatever the level of year-to-year investment, the region's outsized concentration of risk capital will remain an important source of competitive advantage, particularly in technology-led sectors.

Exhibit 20

Ten Bay Area startups are now valued at more than $4 billion, and five have achieved "decacorn" status

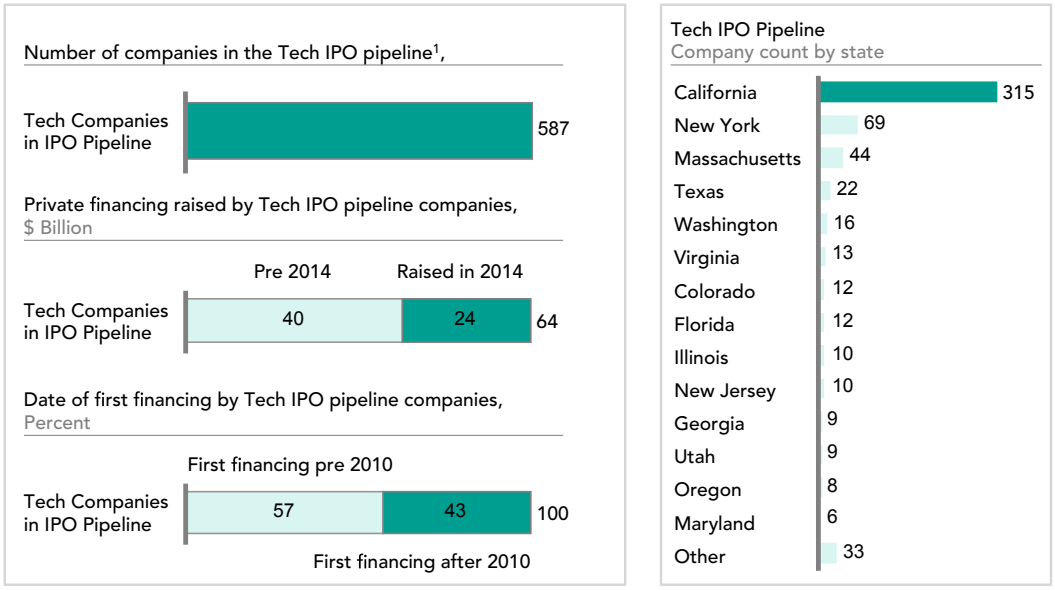


- Across the globe, 166 private startup companies are "unicorns"– those with a valuation over $1 billion – and together they have a total valuation of $618 billion
- The current group of unicorns is 4x larger than it was in 2012 in terms of total valuation
- UBER is now valued higher than 80% of the S&P 500
- The sustainability of the business models of Theranos and Zenefits has recently come under scrutiny

SOURCE: Techcrunch

Exhibit 21

Bay Area tech firms have benefited from a robust private financing market, particularly since 2010



1 Companies with a valuation of over $100 million and demonstrating significant momentum according to CB Insights proprietary data
SOURCE: CB Insights

The potent combination of research universities and private and federal laboratories, talent, risk capital, a diversity of technology disciplines and sectors, and an open environment that accelerates innovation has strengthened the Bay Area's position as the world's leading center for technology innovation and entrepreneurial activity.

This is reflected in the growing number of US and globally headquartered companies that have established R&D operations or innovation offices in the region. Examples include GE, Amazon, Qualcomm, Walmart, and Target. They are joined by an array of global companies: Samsung (Korea), Suning (China), Baidu (China), Alibaba (China), Siemens (Germany), Orange (France), BNP Paribas (France), Swisscom (Switzerland), British Telecom (UK), Vodafone (UK), Deutsche Telekom (Germany), Bosch (Germany), Fujitsu (Japan), Panasonic (Japan), and Airbus (France), among others. US and foreign automotive companies such as Ford, General Motors, Honda, Volkswagen, Mercedes Benz, BMW, Toyota, Honda, and Renault-Nissan have also dropped anchor in the region to be at the forefront of how the cars of the future will be impacted by IT.

The region's outsized concentration of risk capital will remain an important source of competitive advantage, particularly in technology-led sectors.

In parallel, a growing number of global corporations have established venture arms in the region, and overseas governments and their partners support an expanding network of accelerators designed to help startups and early-stage companies from their countries connect to the region's innovation ecosystem. The aggregation of this activity, supplemented by a sustained flow of senior government and university visitors from around the world, has consolidated the region's position as a necessary global partner in technology and innovation.

Sector Diversity as a Difference Maker

Why has Bay Area employment growth been so much stronger in this post-recession period than in the post-dot-com era? While the intrinsic qualities described in section one suggest that Bay Area fundamentals are strong, the region's economy has evolved over time to bring it where it is today.

SECTOR STRENGTH

One factor that has driven strong regional employment growth has been a competitive and diverse sector portfolio. In the recovery following the Great Recession, the Bay Area has held a competitive advantage in multiple industries that have grown faster than the national average. While technology and professional services—the hallmarks of the region—have fueled nearly 40% of the region's job growth, the remaining 60% is explained by other industries also outperforming the rest of the country. This represents a drastic turnaround from the post-dot-com recovery period, when Bay Area sectors—particularly tech—mostly performed worse than their national equivalents, and the region recovered much more slowly than the rest of the country.

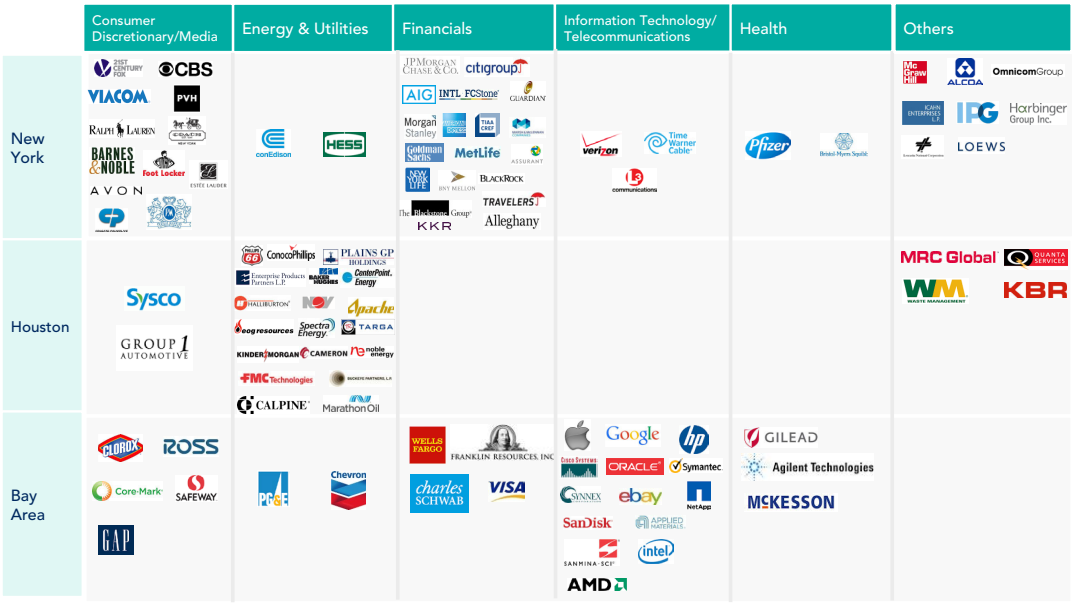
What does this diversity look like at a company level? Two other peer regions, New York City and Houston, attract similar numbers of Fortune 500 companies, but the Bay Area is the only metropolitan statistical area (MSA) that has a variety of companies from all major sector categories (e.g., Consumer Discretionary, Energy, Financials, Healthcare, and Information Technology) (Exhibit 22). New York is mostly a financial hub, whereas Houston is an energy hub.

This theme of diversity has also applied to Bay Area Fortune 500 company sales. Since 2008, sales from Bay Area Fortune 500 companies have increased at a compound annual growth rate of 6%, with virtually all sectors positively contributing to growth (Exhibit 23). That said, while all sectors have increased their sales, Information Technology and Telecommunications has the fastest compound annual growth rate of 11%. While technology has been a leader, non-tech sectors accounted for 50% of the region's Fortune 500 revenue in 2014. This sector diversity provided the regional economy with a soft landing after the Great Recession, and the region has since rebounded due to strength in both tech and non-tech industries.

Exhibit 22

The Bay Area is diversified across top performing companies compared to peers

Fortune 500 Companies by Industry Sector



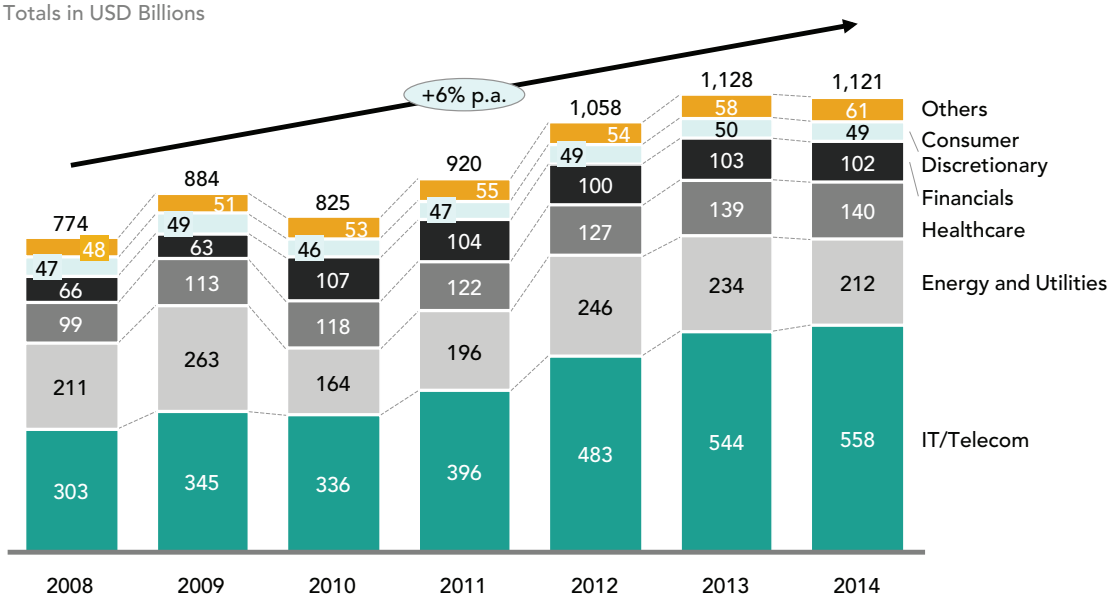
SOURCE: Fortune, Capital IQ, McKinsey analysis

Exhibit 23

Technology has a growing share of Bay Area Fortune 500 revenue, but non-tech sectors add diversity to economy

Bay Area[1] Fortune 500 Company Share by Sector Sales 2008-2014

Totals in USD Billions



1 Bay Area defined as a combination of 12 cities within the State of California
SOURCE: Fortune, Capital IQ

INDUSTRY DISRUPTION

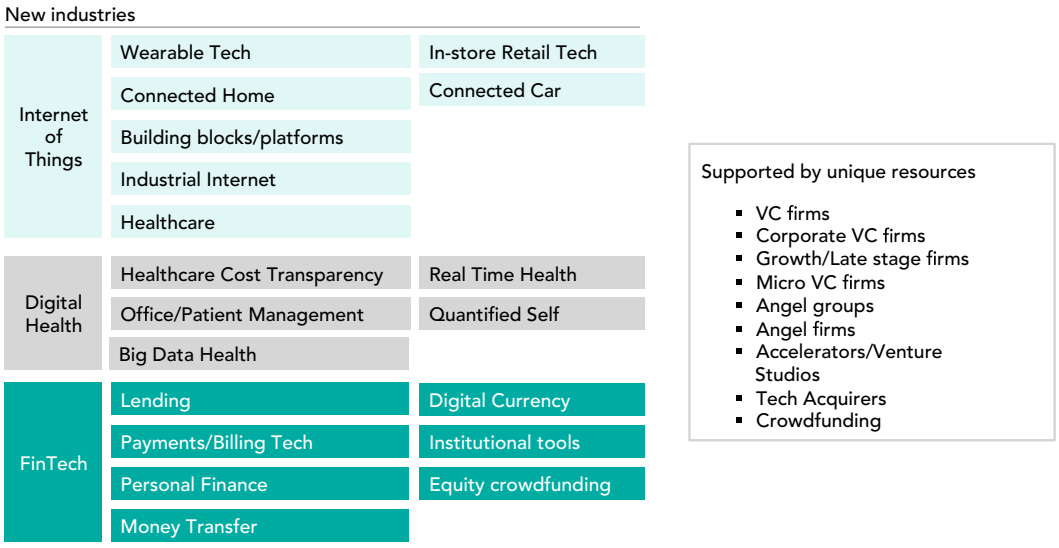
While technology has consistently accounted for 40% or more of Bay Area Fortune 500 sales, the diversification underway within the technology industry is also significant. More than ever, Bay Area technology companies are competing for market share in previously non-core industries where sector stalwarts dominate.

For example, Google's core operations revolve around its advertising, a business with which Google is extremely familiar and which has undergirded earnings for the past decade. However, as reflected in its recent reorganization as Alphabet, its portfolio of business unit initiatives also comprises several high-risk/high-return opportunities, embracing products such as wearable tech, submarine cables, driverless cars and biotechnology, evolving from a software-algorithm-driven service to a company increasingly engaged in the development of physical products.

Google's approach to diversification is indicative of a new technology classification system that is not completely captured by standard government definitions. For example, three new industries, the Internet of Things, Digital Health, and Financial Technology are poised to disrupt the national and global business landscapes. Connected Home (e.g., Nest) within the Internet of Things, Quantified Self (e.g., Fitbit) within Digital Health, and Personal Finance (e.g., Betterment) are a few examples of how technology is changing the stakes of competition (Exhibit 24).

Exhibit 24

The Bay Area is generating disruptive business models



SOURCE: CB Insights

The Bay Area's diversity will likely only increase in the coming years as technology originating here flows into other sectors and disrupts them. With this, the region's role in finance, health, consumer goods, energy, and many other sectors is likely to become more significant.

Spotlight on:

The Bay Area at the Nexus of the Internet of Things (IoT)

National trend:

- The number of connected IoT devices is expected to reach 20 to 30 billion by 2020.
- There is about 10,000 exabytes of global data
- As much as 90% of all data currently created at the edge of the IoT by smartphones, tablets, and other mobile devices is never captured, analyzed, or acted upon. Sixty percent of that data loses its value within milliseconds.

Business-to-business (B2B) adoption:

- B2B adoption of IoT is on the rise. For example, Verizon is saving more than 55 million kWh annually across 24 data centers by deploying hundreds of sensors and control points throughout the data center, connected wirelessly. The result is a reduction of 66 million pounds of greenhouse gases per year.

Role of the Bay Area:

- Leading companies in the IoT space are based in the region, cutting across industries:
  - Connected Home: Nest (Google), iControl Networks
  - Connected Car: Tesla
  - Wearables: Fitbit, Jawbone
  - Healthcare: PatientSafe
  - Connectivity Technology: Kovio, OnRamp Wireless
  - Smart City: Cisco Systems, Silver Spring Networks
  - Advanced Manufacturing: GE Digital

3

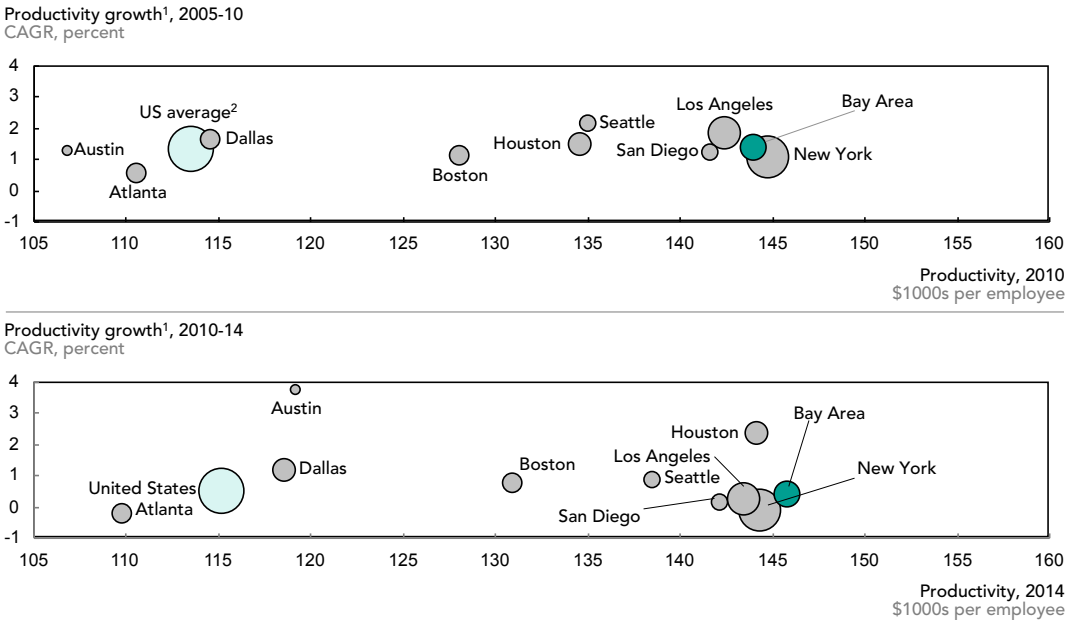
Productivity and Affordability

Productivity has been a core strength of the Bay Area economy since the 1990s, with the region enjoying average productivity growth of nearly 2% annually since 1999. An economy can produce more either by growing its workforce or by becoming more productive. Of the two, productivity is particularly important, as more productive economies tend to experience higher income growth and have higher standards of living and greater long-term stability.

Today, the Bay Area is the most productive region in the US as measured by output per worker, though productivity growth is advancing at a slower pace since 2010 (Exhibit 25). The region's economy has benefited from robust job growth following the recession, though output has grown more slowly than employment. Without productivity gains in the long run, wages will stagnate and a region's competitive advantage will decline. The Bay Area's recent employment growth is excellent for near-term robustness, but its long-term advantages over other regions may be eroding.

Exhibit 25

The Bay Area's productivity competitive advantage has slightly eroded



1 Productivity is defined as real GDP per employee in 2009 dollars
2 US average not to scale 3 Bay Area defined as San Jose, San Francisco, Napa, Santa Rosa, and Vallejo MSAs
SOURCE: BEA, Moody's Economy.com, McKinsey analysis

PRODUCTIVITY ADJUSTED COSTS

Ultimately, the best way to think about productivity and growth is whether job creation leads to incomes that enable a high standard of living given a region's cost of living.

As the Bay Area economy has dramatically strengthened over the past three years, this has been mirrored by a higher cost of living. Rising costs can lead to lower productivity, and when productivity stagnates one consequence is that wages may no longer keep up with the cost of living.

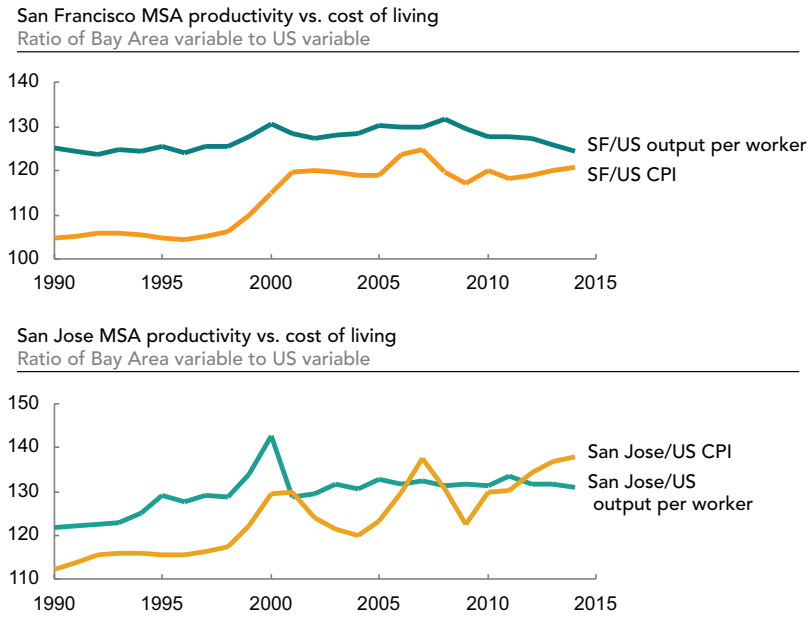
In San Francisco, as costs have risen, productivity has been growing more slowly than the national average since 2008.

This is a concern for the region. In 2014, San Francisco's, San Jose's, and Oakland's costs of living were anywhere from 40% to 70% higher than the national average. A closer examination of component costs shows that housing was the main driver, ranging between 110% and 200% above the national average.

Higher costs of living could hypothetically be offset by higher productivity, but that advantage is eroding. In San Francisco, as costs have risen, productivity has been growing more slowly than the national average since 2008. A similar pattern has emerged in San Jose, where the cost of living is growing even more rapidly (Exhibit 26).

Exhibit 26

Productivity fails to offset increasing cost of living



- The Bay Area's productivity advantage is contracting and even negative in San Jose when adjusted for the regional premium in consumer prices

SOURCE: BEA, BLS, Moody's Analytics

WORSENING AFFORDABILITY

An analysis of housing across all nine counties shows that cost increases are ubiquitous (Exhibit 27). As of 2015, the median sale price for an existing house was anywhere between $349,000 in Solano County to over $1 million in San Francisco and San Mateo counties. Between 2010 and 2015, housing costs increased across all nine counties from 13% to 64%.

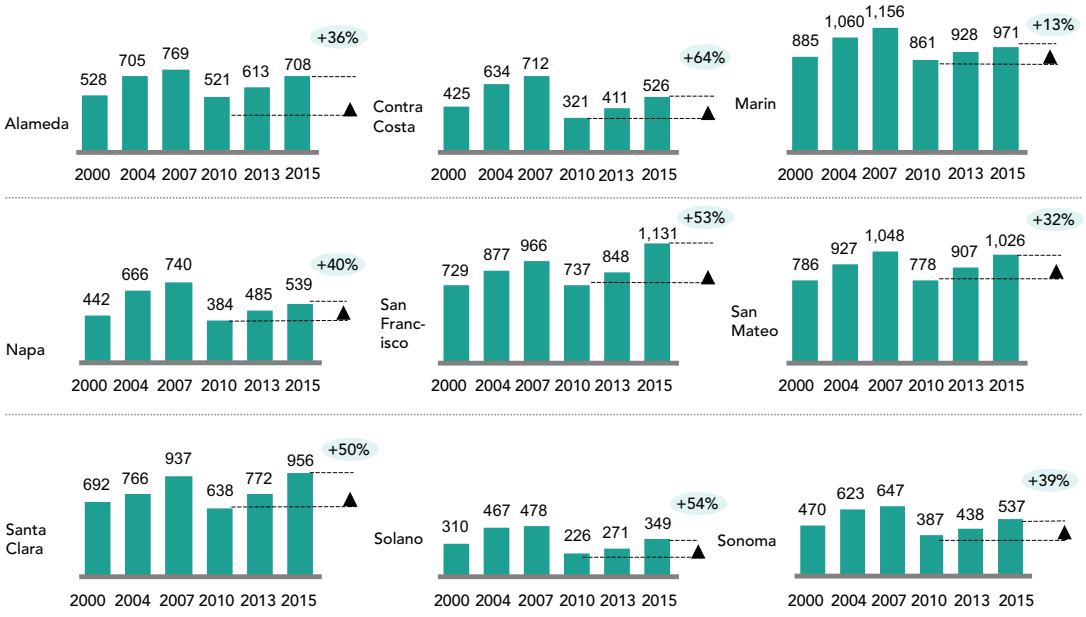
A similar pattern can be seen in rental housing. The rental market in the Bay Area is, according to some sources, the most expensive in the country. According to one data aggregator that sources information from real-time online listings for one-bedroom apartments, Palo Alto, San Francisco, and Cupertino are the three most expensive rental areas in the country, with median rent ranging from $3,100 to more than $3,600 (Exhibit 28). Santa Monica and Manhattan round out the five most expensive areas to rent. Thirteen Bay Area cities rank in the top 20.

These costs have competitive implications for the region. While there is no sign of an exodus, and the region is continuing to draw in talent, recent surveys by Indeed Hiring Lab and Redfin indicate that the number of workers in San Francisco aged 31 to 40 who are looking for a job in a different part of the country grew 12% in 2015, and the number of residents looking for homes outside the Bay Area (using the Redfin site) has grown from one in seven in 2011 to one in four in 2015. Short on alternatives and wanting to preclude a loss of talent, schools and universities in San Francisco, such as UC San Francisco, California College of the Arts, and the San Francisco Conservatory of Music, are now looking to building their own housing.

Exhibit 27

Home prices are dramatically rising across the Bay Area

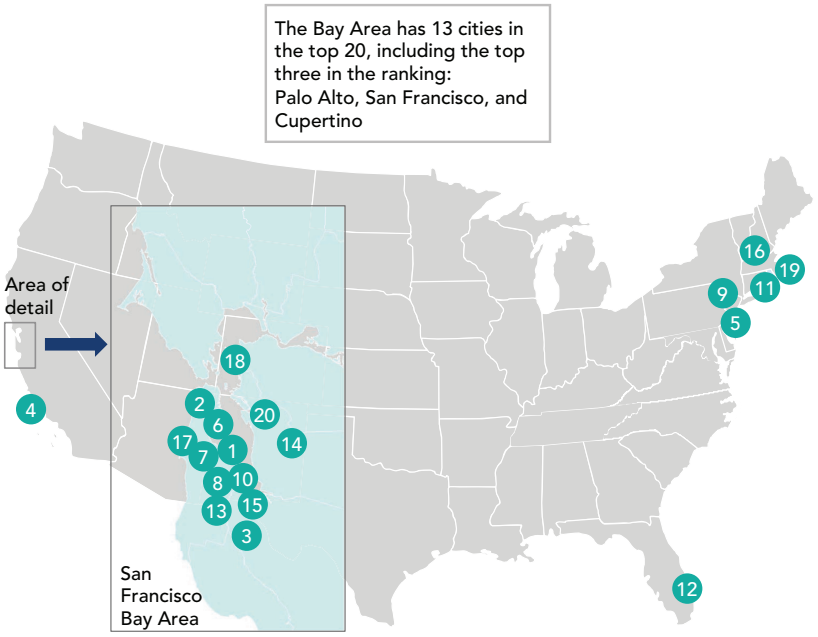
Median home prices in Bay Area counties
$ Thousands[1]



1 Data represents annual average median home price estimate in 2015 dollars
SOURCE: National Association of Realtors, Moody's Analytics, McKinsey analysis

Exhibit 28

On rental listing sites, Bay Area rental costs are higher than most peer cities



Median monthly rent[1] 2015 US Dollars

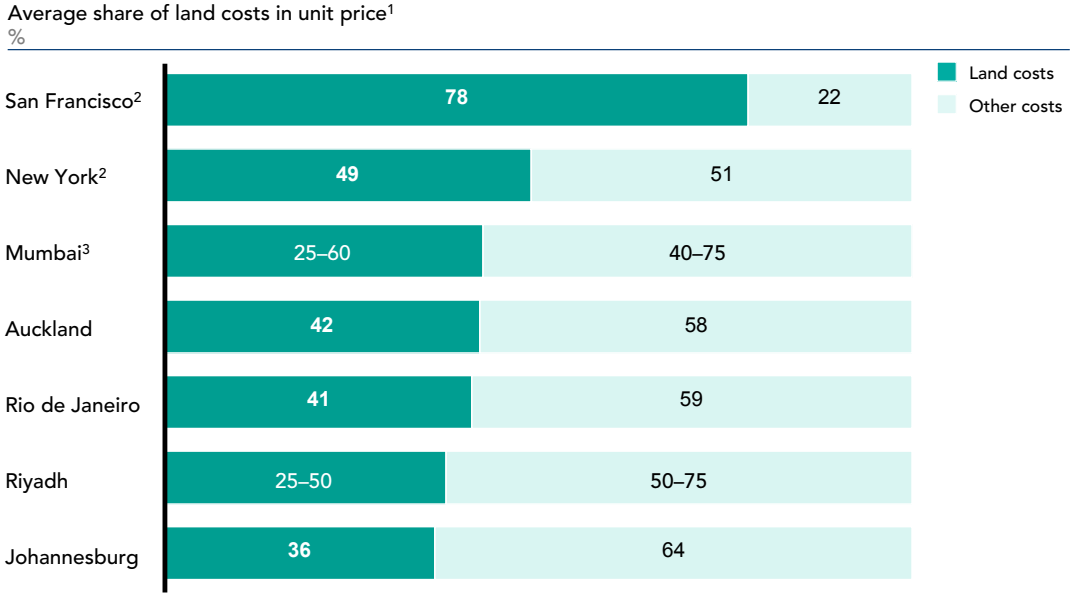
1	Palo Alto, CA	3,645
2	San Francisco, CA	3,488
3	Cupertino, CA	3,136
4	Santa Monica, CA	2,815
5	New York, NY	2,800
6	San Mateo, CA	2,728
7	Redwood City, CA	2,700
8	Mountain View, CA	2,700
9	Hoboken, NJ	2,650
10	Sunnyvale, CA	2,616
11	Cambridge, MA	2,550
12	Weston, FL	2,448
13	Santa Clara, CA	2,446
14	Pleasanton, CA	2,445
15	San Jose, CA	2,400
16	Newton, MA	2,400
17	Daly City, CA	2,400
18	San Rafael, CA	2,351
19	Boston, MA	2,350
20	San Ramon, CA	2,350

1 Rents calculated for one-bedroom apartments. Lovely is an aggregating rental real estate site that compiles data real-time from over 70 US listing sites such as craigslist and apartments.com

SOURCE: Lovely

Exhibit 29

San Francisco has high land costs as a share of total housing unit cost



1 Mumbai, Rio de Janeiro, and Riyadh, 2009; Auckland, Johannesburg, New York, and San Francisco, 2013.
2 New York and San Francisco figures represent "land value share of home value."
3 Range estimated from average property price and sample land transaction in Goregaon, Malad, Chembur, and Mulund, where land transaction data were available. Assumed floor-area ratio = 1.33 as average of Mumbai city.

SOURCE: Land and property values in the US, Lincoln Institute of Land Policy; Guanyu Zheng, The effects of Auckland's metropolitan urban limit on land prices, New Zealand Productivity Commission, March 2013; TOKI website; expert interviews; ABSA Report; Mumbaipropertyexchange.com; Sulekha.com; McKinsey Global Institute analysis

What is driving the high costs of housing in the Bay Area? A recent study on affordable housing from the McKinsey Global Institute reveals that in San Francisco, land and existing property costs account for approximately 78% of total new construction costs, the most of any peer MSA analyzed in the report (Exhibit 29).

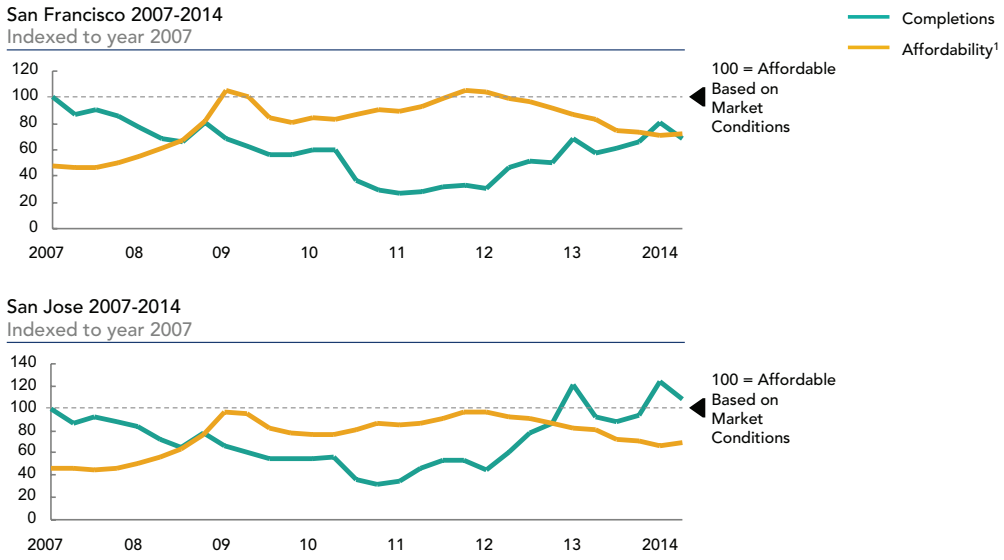
Housing completions are growing in the Bay Area, but not at a rate sufficient to meet natural population growth and in-migration.

In San Francisco and throughout the region, high construction costs, including special prupose fees imposed by local governments, and restrictions on housing development are other important contributors to cost. Whereas the foreclosure glut after the Great Recession briefly stalled building and put downward pressure on housing prices, as inventory subsequently decreased with the recovery, so did affordability (Exhibit 30). In both San Jose and San Francisco, while affordability (a function of prices, income, and financing terms) improved between 2007 and 2011, it has worsened substantially since.

Housing completions are growing, but not at a rate sufficient to meet natural population growth and in-migration. Because the gap between supply and demand is continuing to widen, current rates of construction are insufficient to significantly impact affordability. It should be noted that the current gap builds on an existing housing deficit that has accumulated over decades. Looking forward, the ability of the Bay Area to produce more housing at all price levels will be key to addressing the affordability crisis and preventing the region's productivity edge from further eroding.

Exhibit 30

The pace of housing construction is increasing, but is insufficient to meet demand



1 Median area family income divided by minimum qualifying income for paying for a house. Minimum qualifying income is defined as annual mortgage payment for a median priced home assuming no more than 25% of annual income goes to this payment. A value of 100 means that a family with the median income has exactly enough income to qualify for a typical mortgage on a median-priced single-family home. An index above 100 signifies that the family has surplus income. An index below 100 signifies a lack of affordability.

SOURCE: Moody's Analytics

4

Perennial Problems Persist

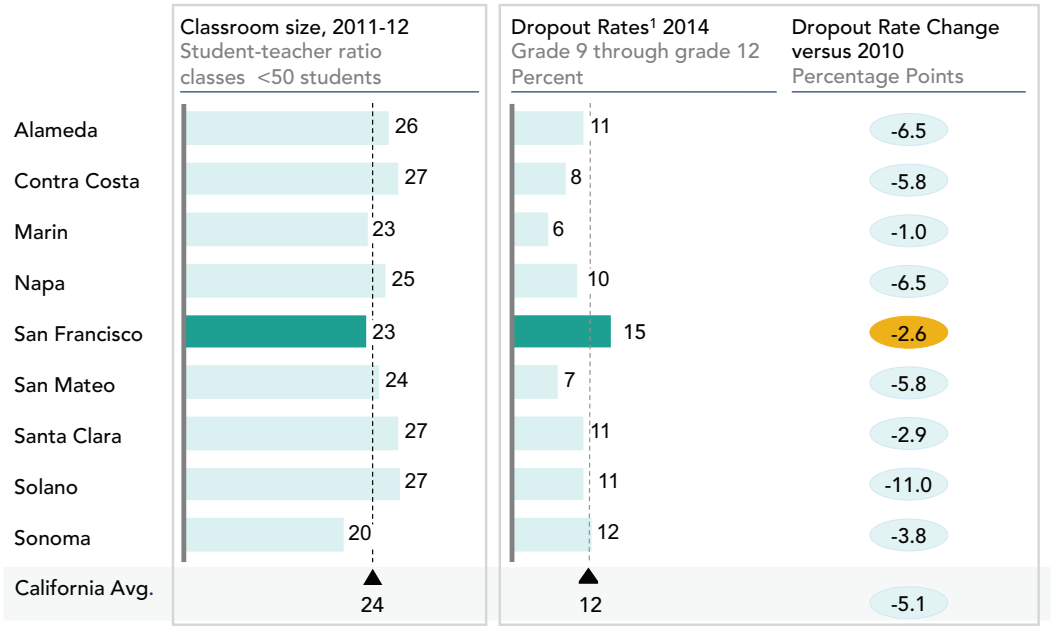
This analysis has described the strength of the Bay Area economy as the region continues to move past the Great Recession, as well as its byproducts of eroding productivity and affordability. Besides housing, there are other underperforming enablers that, if unaddressed, could constrain future growth.

K-12 CHALLENGES

K-12 educational performance indicators continue to lag. Graduation rates are important (Exhibit 31), but the quality of K-12 education is even more important. While there have been improvements, California ranks last relative to peer states in terms of both 4th grade and 8th grade reading and math proficiency (Exhibits 32, 33). Further improvement will be important to California's ability to support a competitive, high-skilled workforce, both at the technical level and as students transition to four-year universities.

Exhibit 31

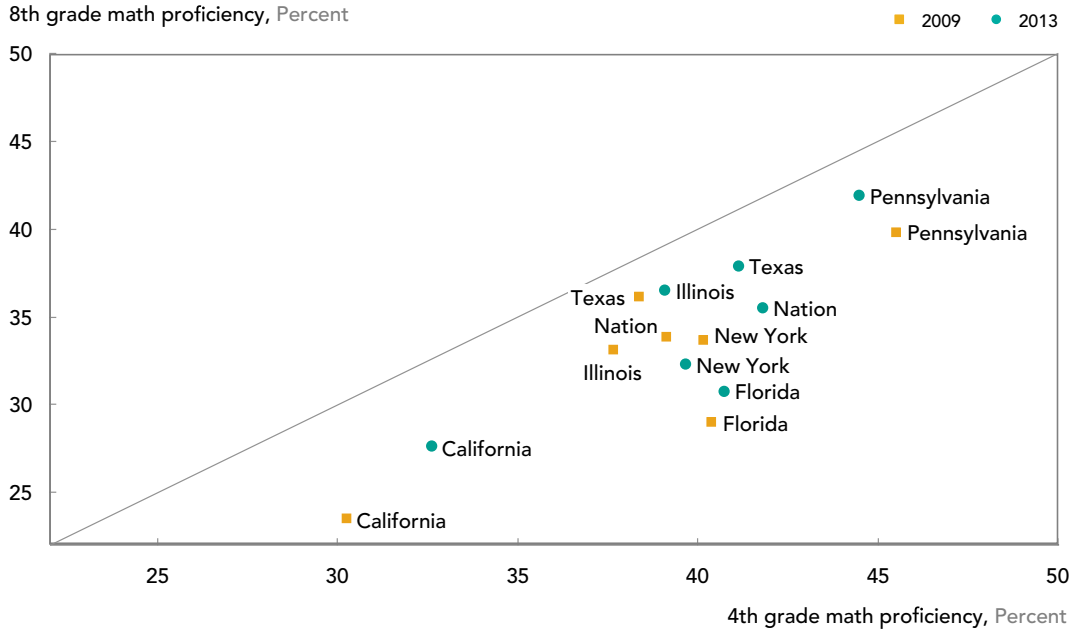
While most Bay Area county education metrics are in line or better than statewide averages, San Francisco's dropout rate remains high



1 The four-year derived dropout rate is an estimate of the percent of students who would drop out in a four-year period based on single year data
SOURCE: California Department of Education, McKinsey analysis

Exhibit 32

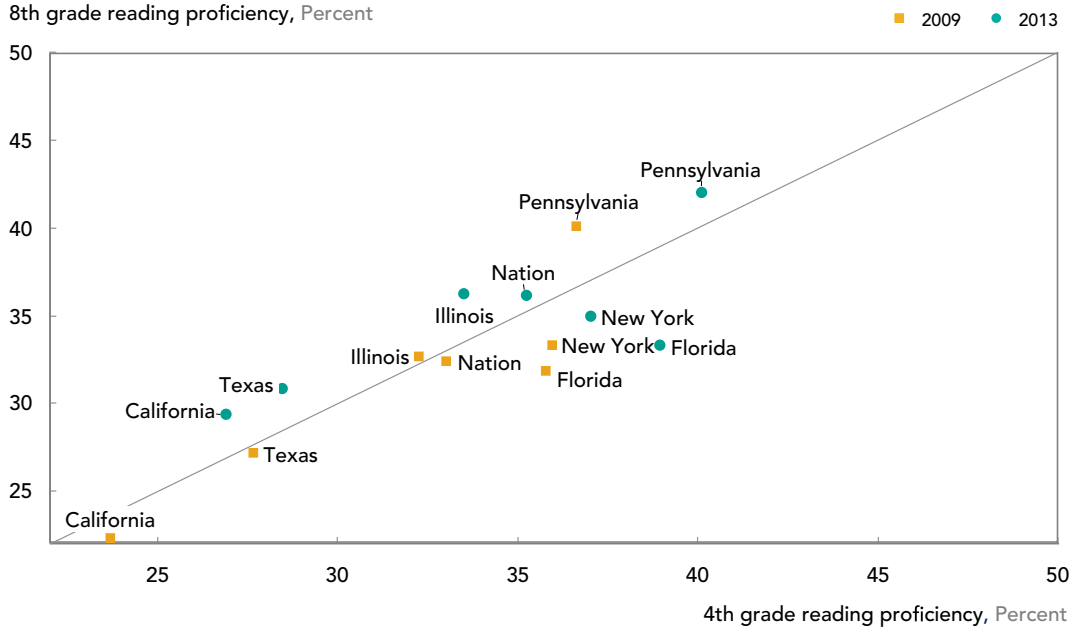
California made gains in math proficiency in the past four years but still lags peers



NOTE: The overall national results include both public and nonpublic school students
SOURCE: National Education Assessment Program

Exhibit 33

While Californian students still lag peers, the state has made progress in reading proficiency from 2009 to 2013



NOTE: The overall national results include both public and nonpublic school students
SOURCE: National Education Assessment Program

HIGHER EDUCATION CHALLENGES

As highlighted earlier in this report, the Bay Area has a larger share of college-educated residents than any peer MSA. Likewise, a larger share of the Bay Area's college-educated population grew up locally than in any peer MSA. Looking forward, the quality and productivity of the Bay Area's higher education system will be central to maintaining this human capital advantage.

Several factors could threaten this advantage. Average Californian higher education costs have more than doubled in the past decade (Exhibit 34). Meanwhile, in the California State University (CSU) and University of California (UC) systems, General Fund spending per student has decreased 35% and 44%, respectively, since 2000. This drop of funding has been met by significant tuition increases (Exhibit 35).

California's leaders should reconsider this decline in support for public higher education and recognize its critical role in supporting a competitive workforce and economy. A failure by the state to adequately invest will impact public universities' ability to attract the best faculty and students, support California's growing proportion of minority students, and deliver the workforce of the future.

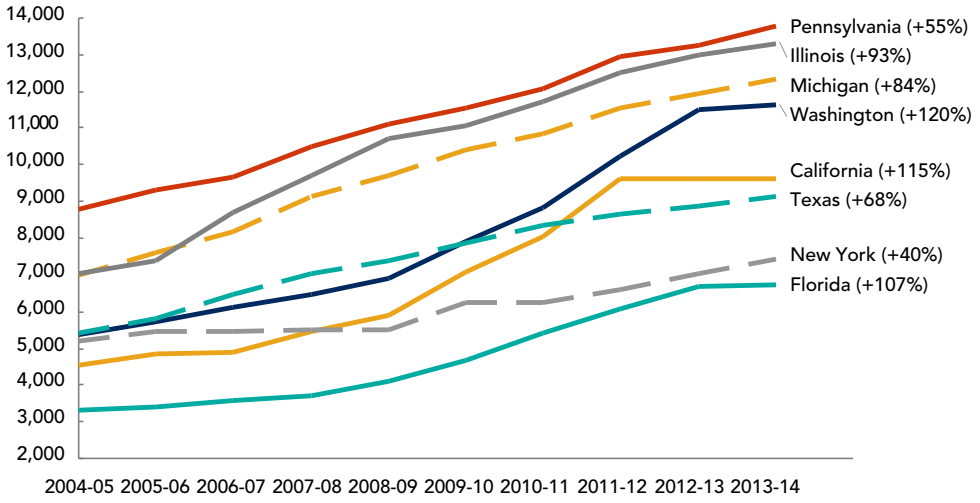
California's leaders should reconsider the decline in support for public higher education and recognize its critical role in supporting a competitive workforce and economy.

Exhibit 34

There has been a sharp rise in tuition for higher education nationally

Tuition[1] by state, 2004-2014

2014 US Dollars



1 Includes four-year public universities
SOURCE: College Board

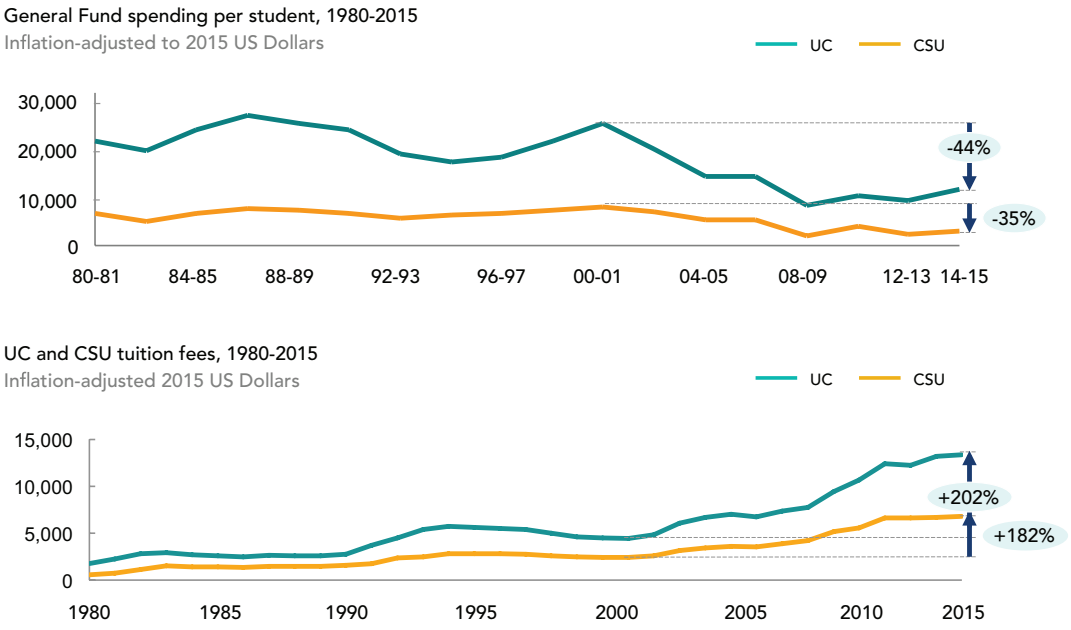
The University of California and the California State University systems and the community colleges also need to reconsider their business models and how education is delivered. This can happen through closer collaboration among the three components of the state's higher education system, by accelerating the use of online technologies with the potential to expand educational outreach—often at lower costs—and by continuing to pursue efficiency.

The Public Policy Institute of California estimates that by 2025, there will be a significant shortage of educated workers in the state. If current trends persist, 41% of jobs will require at least a bachelor's degree and 36% will require some college education. These requirements indicate a 6% to 8% gap between supply and demand of educated workers, amounting to a shortfall of 1 to 2 million workers (Exhibit 36).

Career technical education (primarily provided through community colleges) presents a particular challenge, as technology-enabled manufacturing in California grows and as more workforce participants need both higher skills and retraining. Recent progress in this area needs to be sustained.

Exhibit 35

In California, tuition increases have shifted costs from the state to students and their families

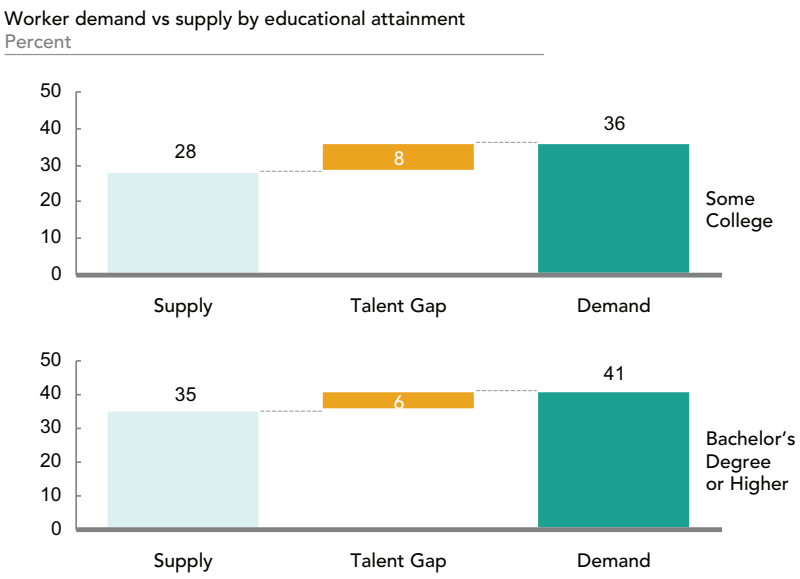


Note: Includes mandatory campus-based fees. Annual tuition and fees are in 2015 dollars.
SOURCE: California Budget Project; University of California Office of the President; and California State University Chancellor's Office

Exhibit 36

California faces a significant gap for qualified talent

California qualified worker supply[1] versus demand[2] 2025

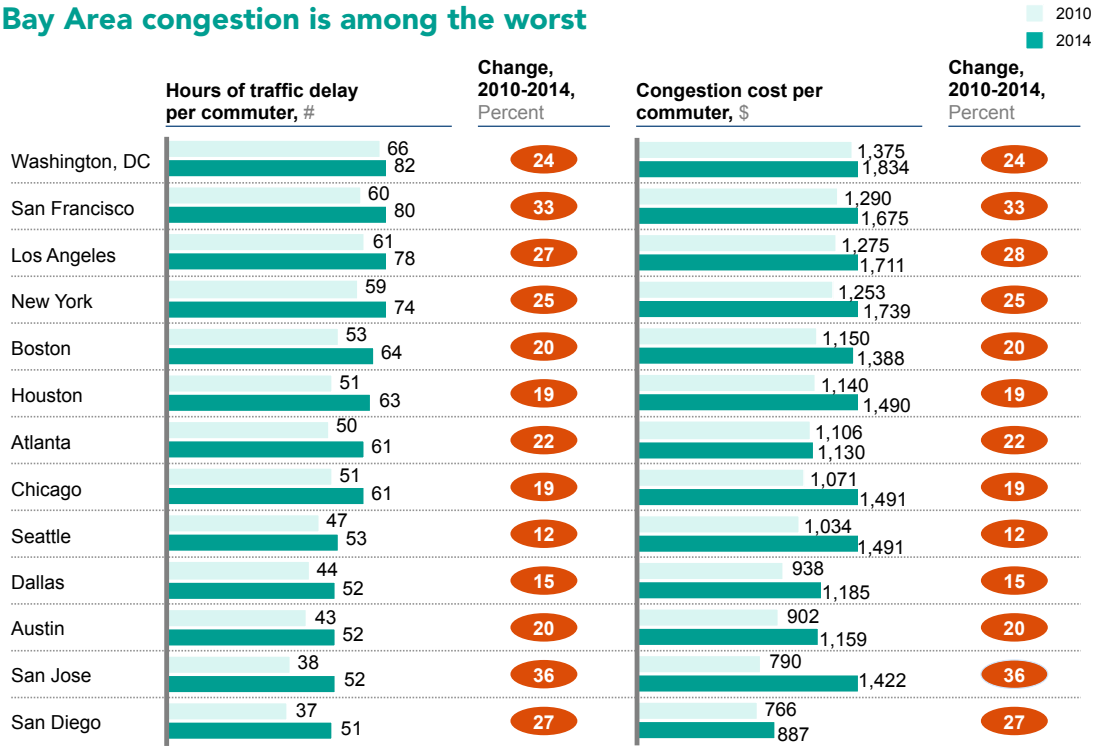


- If current trends persist, 41% of jobs will require at least a bachelor's degree and 36% will require some college education short of a bachelor's degree.
- Relatively fast growth in the healthcare and IT sectors are driving up demand for these qualified workers

1 Supply defined as share of workforce (people between 15-64 years) with the specified educational attainment
2 Total projected jobs (defined as share of total workforce) with the respective educational attainment requirements
SOURCE: Public Policy Institute of California

Exhibit 37

Bay Area congestion is among the worst



SOURCE: Texas Transportation Institute

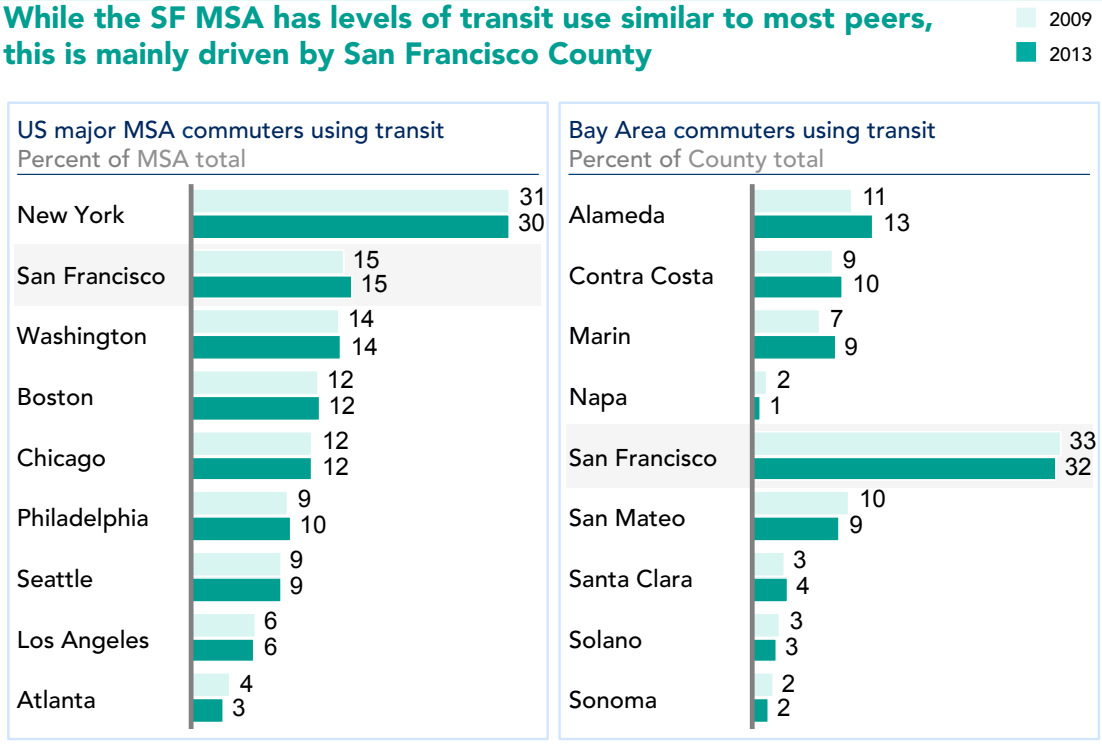
STRAINED PHYSICAL INFRASTRUCTURE

Transportation presents another critical challenge. The cost of congestion is higher in San Francisco than in any other US city except Washington, DC. The average San Francisco commuter spends about 80 hours in traffic per year, equating to about $1,675 of wasted time (Exhibit 37). San Jose also ranks in the top 12 most congested cities.

Public transportation use in the region is particularly driven by San Francisco County, where a third of commuters currently use public transportation. In other Bay Area counties, fewer than 10% of commuters use public transportation (Exhibit 38). To address the Bay Area's growing mobility challenge, accelerated investment is needed in all modes of transportation. First and foremost is BART. Its system has seen a steady increase in ridership levels in recent years and at peak hours operates above capacity at its core in the Transbay Tube.

Exhibit 38

While the SF MSA has levels of transit use similar to most peers, this is mainly driven by San Francisco County



SOURCE: US Census three-year estimates, MTC

BART is planning to repair its aging infrastructure and increase its capacity through investments in new train cars and an advanced train-control system. These investments will enable longer trains operating at greater frequency. To pay for further system improvements, BART is likely to bring a $3.5 billion ballot measure to voters in November 2016.

Though necessary, even this investment is insufficient to meet growing demand in the long term. At peak times the Transbay Tube carries 28,000 passengers per hour, double the number crossing the Bay Bridge. As the tube and the bridge both are currently at capacity in peak commute hours, planning must begin for a second transbay transit crossing. A second crossing will increase the system's capacity as the region's population and job base grow, and provide important redundancy for maintenance and to manage emergencies. Building it should not take 25 to 30 years, which is the norm for large public projects of this type, but should be advanced as a regional priority now.

Other infrastructure priorities include the electrification of Caltrain—the commuter rail workhorse linking San Jose, San Francisco, and the Peninsula. Caltrain's electrification will enable improvements in capacity and frequency, critical to ensuring the system's economic viability and meeting future demand. Caltrain has experienced five straight years of strong growth in ridership. The system carried 71% more passengers during weekdays in 2015 compared to 2010.

On the water, Water Emergency Transportation System (WETA) ridership has risen 56% since 2013, with key routes such as Vallejo and Alameda operating at capacity. Golden Gate Transit's ferry system has seen ridership increase by 17% since 2012, with many ferries sold out. While ferry services account for only a small portion of total transit weekday ridership in the region—16,000 out of 1.7 million—they provide important relief for congested roads and bridges. Before construction of the bridges, the Bay Area had the largest water transit system in the world, carrying nearly 50 million passengers annually at a time when the region's population was much smaller. Today, when diverse transit options are a necessity, building a more extensive, high-capacity water transit system should also be a priority.

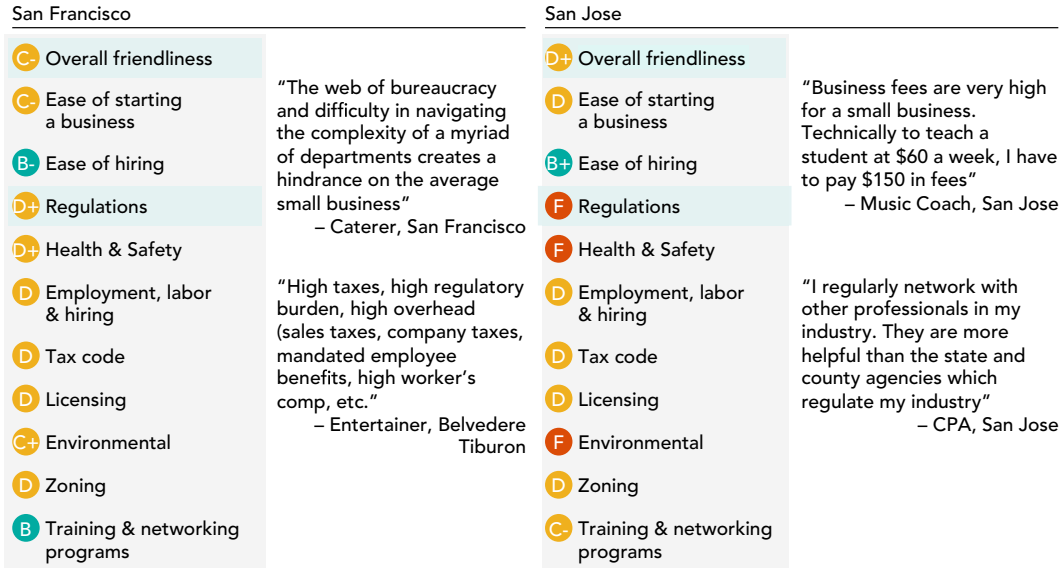
SUCCESS IN SPITE OF REGULATORY COMPLEXITY

While the economy has experienced strong growth since the Great Recession, California continues to be burdened with a complex regulatory environment that increases the cost of doing business, particularly for smaller businesses. For example, although the proportion of small businesses that believe the California business environment is improving has grown, an equal proportion believes that it has not. Of those who cite feeling worse about California business conditions, over 50% cite taxes and 49% cite regulatory complexity. Many small businesses grade San Francisco and San Jose poorly in terms of overall regulatory friendliness (Exhibit 39).

Exhibit 39

Businesses frequently cite regulation as a headwind for growth

2014 Small Business Survey



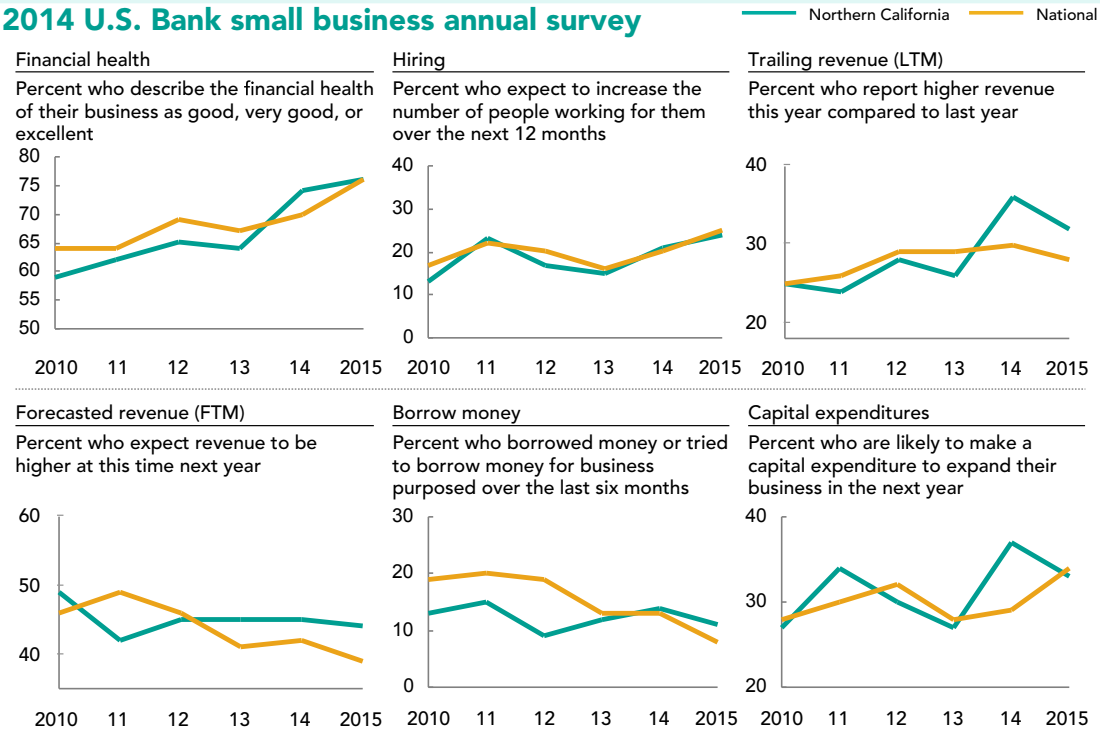
SOURCE: Kauffman SMB survey

Nonetheless, a larger share of Northern California small businesses reported a stronger fiscal 2014 than did the national sample of small businesses. Likewise, a larger proportion of Northern California small businesses were expecting to grow (Exhibit 40). A 2016 American City Business Journals study of small business activity across the United States ranks the San Francisco-Oakland metropolitan area sixth and Silicon Valley ninth out of 106 metropolitan areas assessed for small-business vitality.

Looking forward, taking measured steps to improve the transparency and efficiency of the state and regional business environment will be important to achieving the Bay Area's full growth potential.

Exhibit 40

2014 U.S. Bank small business annual survey



SOURCE: 2014 U.S. Bank Small Business Survey

INVESTING TO SUSTAIN SUCCESS

Most of the Bay Area's current challenges are a product of its extraordinary success and reflect a level of activity and opportunity most regions of the country or of the world could only wish for. The region has built a reputation as the world's leading center for technology, innovation, and entrepreneurship, with a critical mass that continues to attract talent, companies, and investment.

The region must continue to reinvest in the assets that have made it great and that are a precondition to sustained long-term growth and a high quality of life: a skilled and educated workforce, housing where they can live, and infrastructure that provides mobility.

We should not take this success for granted. Instead, the region must continue to reinvest in the assets that have made it great and that are a precondition to sustained long-term growth and a high quality of life: a skilled and educated workforce, housing where they can live, and infrastructure that provides mobility.

Economies inevitably go through cycles, and at some point the current pace of growth will slow or reverse. In the past, the Bay Area has been resilient in the face of these downturns; future success will depend, however, on meeting both new and old challenges. As the complexity of global competition and of regional needs grows, the Bay Area must increasingly look to regional solutions and strategies to identify key priorities and act on them. If we think and invest strategically, the Bay Area can maintain its current status as a national and global economic leader well into the future.

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