TERNER CENTER FOR HOUSING INNOVATION
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Making It Pencil: The Math Behind Housing Development (2023 Update)

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Introduction

Developing new housing is a complicated process that requires years of planning and resources before the first shovel ever hits the ground. These costs and complexities have become even greater in recent years. Changing macroeconomic conditions, including inflation and rising interest rates, affect the availability and cost of capital, and have pushed up labor and material costs. Workforce and supply shortages have further exacerbated the already high price of construction in California, and economic uncertainty has made typical financing partners—such as lenders and equity partners—apprehensive about supporting new housing development.

Given these additional layers of uncertainty and the ongoing housing supply shortage, it is more important than ever for policymakers and housing advocates to understand the "math" that developers use to decide whether they can start a project to build more homes. Without a baseline understanding of these financial concepts, policymakers may create regulations that undermine housing production goals, even if those laws or policies are well-intentioned. However, very few resources exist to explain that math to those outside the real estate industry.

In 2019, we published Making It Pencil: The Math Behind Housing Development to serve as a resource for anyone engaged in housing policy conversations to better understand the development decision-making. Since then, several inputs to this "math" have shifted, from interest rate increases to the rising cost of concrete. While the fundamental principles behind how developers make their decisions have remained the same, the changing economic conditions have made it even more difficult for housing development projects to "pencil", or make sense financially.

To help explain the implications of these shifts, we have updated our earlier work with new data. This brief explains the steps a developer takes to design, finance, build, and determine the rents for market-rate housing in the current market environment. We answer the following questions:

- What are the various costs that go into the development of new housing?
- How are new housing developments financed?
- What are the benchmarks required by financial institutions and capital sources to invest in new housing?
- How do various requirements impact the ability of developers to deliver projects?

We found that it has become increasingly difficult to get projects to pencil in many parts of California, including the Bay Area, Sacramento, and Los Angeles. The example case study "deals" we created in 2019 for the most part are no longer financially viable in current market conditions. These changing market conditions help to explain why many typical market-rate multifamily projects are stalling across the state.

While some market factors are largely out of the control of policymakers, many factors that influence developer decision-making are within the control of elected officials and planning professionals and therefore these dynamics do have implications for public policy. The amount of parking required for new homes, the time it takes to approve a project, the amount or depth of affordability requirements, and impact

fees to be charged all add cost to a potential development and could be changed through policy. In many cases, the level at which such policies are set can make or break the financial feasibility of new housing development. While there may be reasonable motivations to put such policies in place, many policymakers are not aware of the tradeoffs. Without knowledge of how policy decisions affect development feasibility, policymakers run the risk of implementing requirements that are not well-calibrated to the broader real estate market. This can curtail the creation of badly-needed new housing supply, exacerbating the housing shortage.

This paper starts with an explanation of how we developed our pro forma case study models and then explains how various market conditions have changed between our original analysis in 2019 and our updated models in 2023. We then walk through the case study development characteristics and assumptions that informed our updated analysis. This includes a detailed explanation of the financial metrics and terms that inform project feasibility. We end with an exploration of policy alternatives and their impact on project viability, and discuss the implications of this work on broader housing policy.

Methodology

Underlying every housing project is a "pro forma"—the financial analysis a developer uses to estimate total development costs relative to projected income (e.g., the revenue from monthly rents or sales) in order to determine financial feasibility. Every type of project, whether it is a two-story duplex or a 20-story, 300-unit building, will have a different cost and return calculus associated with it.

While there are many types of development (e.g., highrises, townhomes, accessory dwelling units), this paper focuses on one specific type: a market-rate, mid-rise, rental apartment building. Our case study development model is a multistory residential building with a concrete podium first floor (classified under the state's residential building code as "Type 1") and wood frame construction above (classified as "Type 5"), hence this construction type is typically called "five-over-one". We did not examine for-sale developments because multifamily for-sale projects at this building scale are relatively uncommon. Since different construction types are subject to different costs and code requirements, the results of this prototype analysis should not be extrapolated to other forms of development. For example, high-rise construction above 85 feet (or roughly seven stories) typically requires a shift from wood frame building materials to concrete and steel, which raises the cost of a project considerably. Conversely, a smaller-scale housing type such as a townhome project would require less intensive construction (e.g., no elevators and wood-frame construction) which might lower the development costs.

Regardless of building type, the financing principles of any new housing development are the same: any project must demonstrate the ability to meet an acceptable financial return in order to obtain the capital necessary to pay for the construction and operation of the project. To demonstrate how pro formas can vary by location, we model hypothetical projects in four different areas of California: the East Bay (e.g., Uptown or Downtown Oakland), the South Bay (e.g., San José or Santa Clara), Sacramento (e.g., Downtown or Midtown), and the Westside of Los Angeles (e.g., Santa Monica or West Los

Angeles). As with building type, costs can vary significantly by region as the result of different building codes, local requirements (e.g,. impact fees or affordability requirements), and labor markets.

To determine project costs, we worked with the real estate financial modeling firm MapCraft who directly surveyed real estate industry professionals in each of these areas to provide a broad estimate of how much these projects would cost in current market conditions. To determine whether the prototypes would pencil in each market area, we also made a series of assumptions regarding the financial thresholds each project must meet. Financing dynamics also drive housing costs, as the obtainable rents or sales prices for a project must support the overall cost to develop, while also meeting the financial requirements of banks and investors. As with project cost, these assumptions (explained in more detail below) were vetted with lenders, equity providers, and developers and are used as reasonably representative benchmarks for their respective market areas at the time of this analysis.

Beyond these baseline assumptions, we also examined how changes in pro forma inputs, such as higher impact fees, density bonuses, or reduced parking requirements, changed the projects' calculus and potential for feasibility. This additional analysis was done to explore how different policy priorities are reflected in the development math.

The next section looks at what has changed in the development math for our pro forma projects between 2019 and 2023. Following that section, we walk through the characteristics of the pro formas, the assumptions behind our calculations, and the real estate metrics and terms that inform the projects' viability.

From 2019 to 2023– What Has Changed?

The residential real estate development market has changed dramatically since the first edition of "Making It Pencil," such that our original case study pro formas no longer pencil today. A combination of rising costs, high interest rates, tightening financial requirements and relatively flat or declining rents have made new residential development, as examined through our case study pro formas for Los Angeles, the Bay Area, and Sacramento, infeasible. Absent significant market or policy changes, these buildings are unlikely to be built, which has implications for long-term housing availability and affordability.

These market changes have been driven by historically high rates of inflation that have disproportionately impacted the residential construction sector. In 2021, construction costs increased by 11.5 percent over the previous year. In 2022, those costs rose even faster, at 14.1 percent.[1] These increases were brought on by a mix of factors, including disruptions to the supply chain, leading to higher costs for goods and extended wait times for critical materials such as concrete, lumber, roofing insulation, or HVAC equipment.

As shown below in Figure 1, total hard costs of development for the multifamily prototypes in each region increased compared to the same project in 2019. The increase was most pronounced in Sacramento, though costs there remain lower than in the Bay Area.

Soft costs—which refer to costs such as fees charged by local governments, financing, consulting, and tax, title, and insurance—have also increased across each of the prototypes as shown in Figure 2. Since soft

Figure 1: Terner Multifamily Prototype Case Study Hard Costs 2019 and 2023 (in Millions)

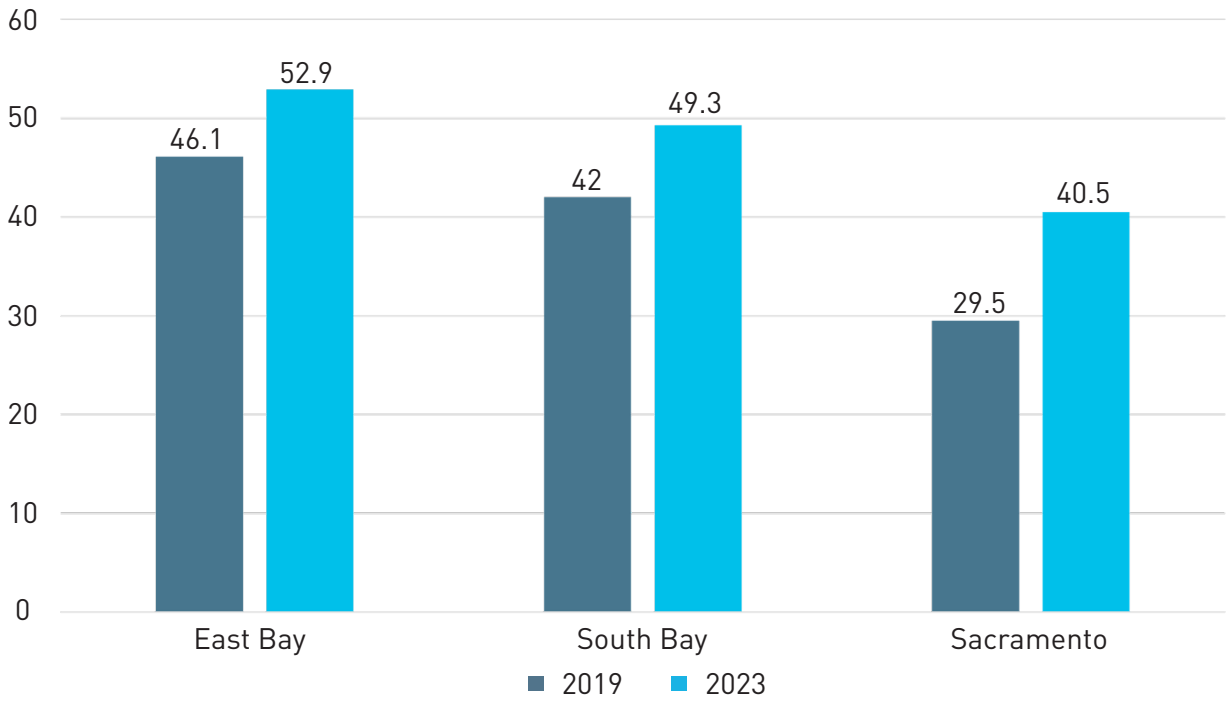
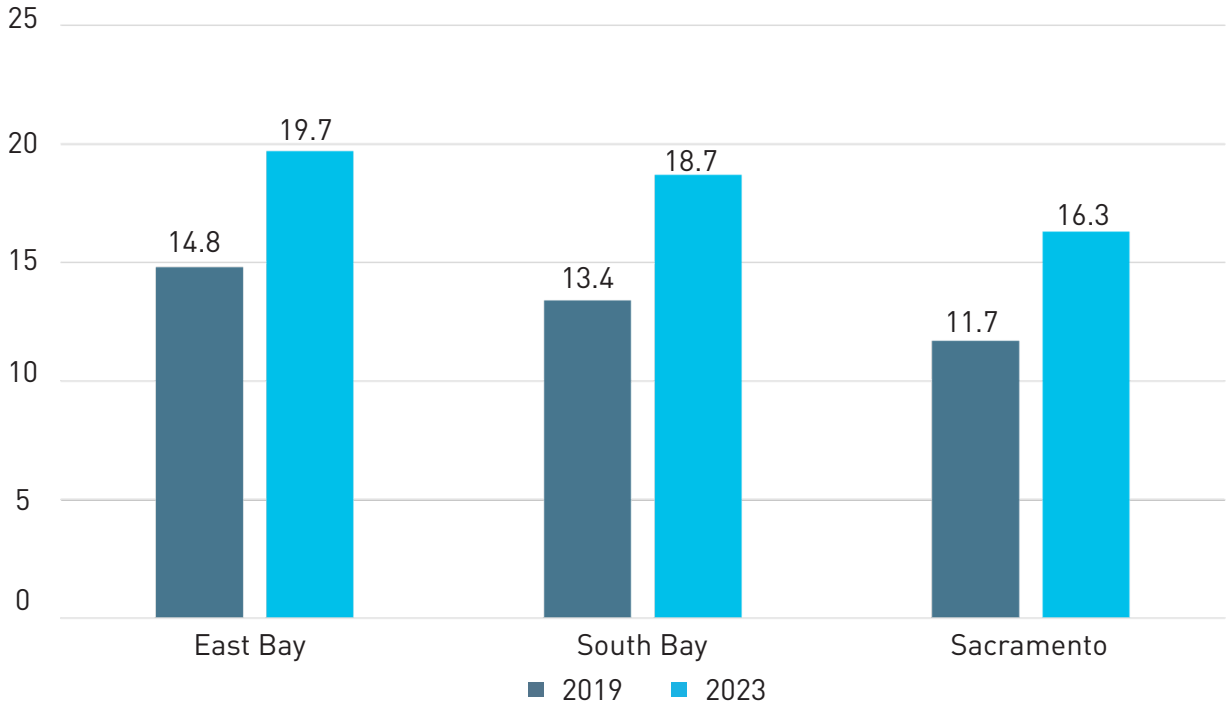


Figure 2: Terner Multifamily Prototype Case Study Soft Costs 2019 and 2023 (in Millions)

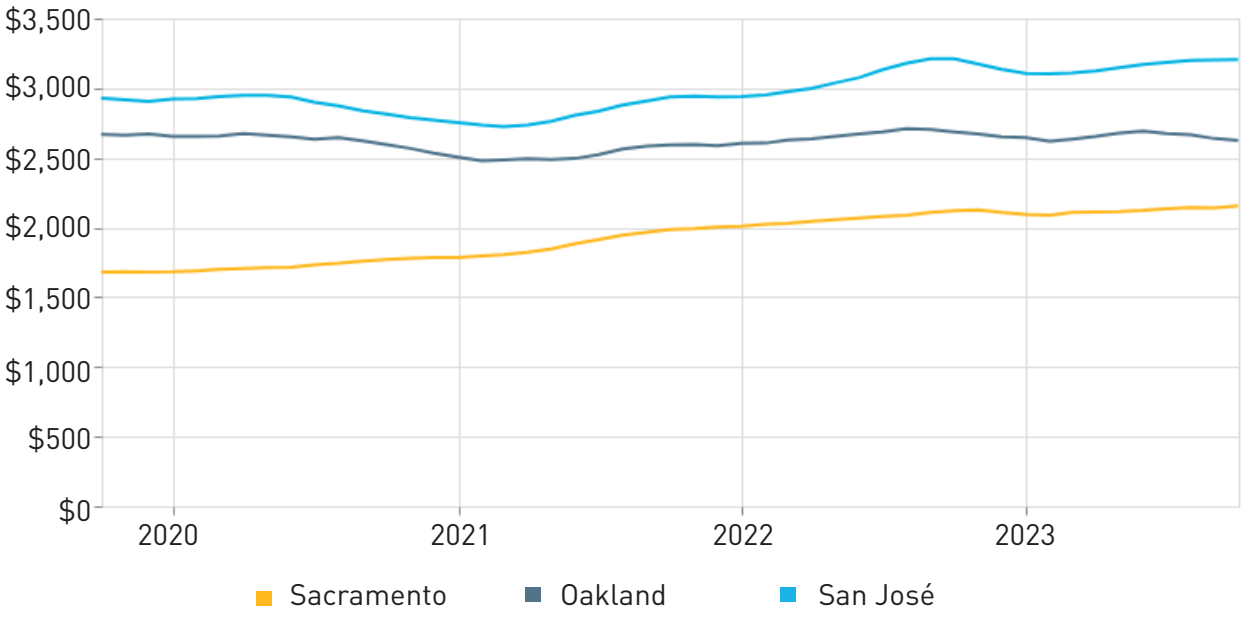


costs are often estimated as a percentage of overall cost, this is to be expected. For example, since construction loan origination fees are generally set at one percent of the total loan amount, it makes sense that a more expensive project will push this soft cost higher. Some increases in soft costs are attributed to higher fees charged by third party consultants, such as architects and engineers, who are themselves facing rising costs. Soft cost contingencies required by financial partners are also higher to reflect the current volatility in the market.

Land prices have also been volatile over the last four years, though in very different ways depending on the current use for the land. Prices for sites suitable for large multifamily development have not seen the same price appreciation in our case study regions as for single-family homes, for example. As described in more detail below, prices for land behave differently than other cost variables in that they reflect expected profitability of future development. But in many cases, developers told us that the residual land value, that is the value after accounting for project costs and revenues, for projects in some markets today is close to zero. This means that housing developers would not be able to pay very much for the land, which makes it more likely the land will either not be developed or it will be used for a more profitable non-residential use.

While nearly all costs have increased since 2019, rents have not kept pace in larger cities and in some instances have fallen, as shown in Figure 3. This dynamic creates challenges for new housing development as developers cannot always absorb higher construction costs if projected revenues do not rise enough to cover cost increases. In Oakland, for example, rents over the past four years have been largely stagnant, and today are slightly lower than they were in 2019. In San José, after dipping lower during the middle of the pandemic,

Figure 3: Typical Market Rent, September 2019-September 2023



Source: Zillow Observed Rent Index

rents have largely recovered and today are roughly nine percent higher than before the pandemic. In contrast, rent growth in Sacramento has been steady since 2019, increasing by 28 percent overall. That said, rents charged in Sacramento are still below average rents in both San José and Oakland.

Lastly, return requirements have increased and financial underwriting has tightened. For debt, rising interest rates have greatly increased the cost of loans. Between 2019 and 2023, interest rates for residential development loans increased from five percent or lower to over eight and a half percent, according to builders surveyed for this analysis. In addition, loans that banks are willing to make cover less of the overall project cost as banks further hedge against risk. In 2019, we used a 65 percent Loan to Cost (LTC) metric, which refers to the amount a bank will finance of the total project cost. In 2023, that ratio dropped to roughly 55 percent. This downward shift means that developers must bring in more equity—private investment with associated expectations for profit to the investor—to cover the gap created by what the bank will not lend. Equity is traditionally more expensive than debt given its higher level of risk, and equity return expectations have become more difficult to meet in our selected regions. As explained in further detail below, developers can measure project returns by measuring the expected year-one profit of a new project (known as the return-on-cost) against the return of buying a similar, occupied apartment building in the same area (capitalization rates). In 2019, many investors were willing to invest in projects that could demonstrate a return-on-cost (ROC) that was between 0.5 and 1.0 percent higher than capitalization rates. Today, investors require project ROC to be 1.0 to 1.5 percent higher than capitalization rates, meaning

Figure 4: Comparison of 2019 and 2023 Capitalization Rates in Case Study Cities

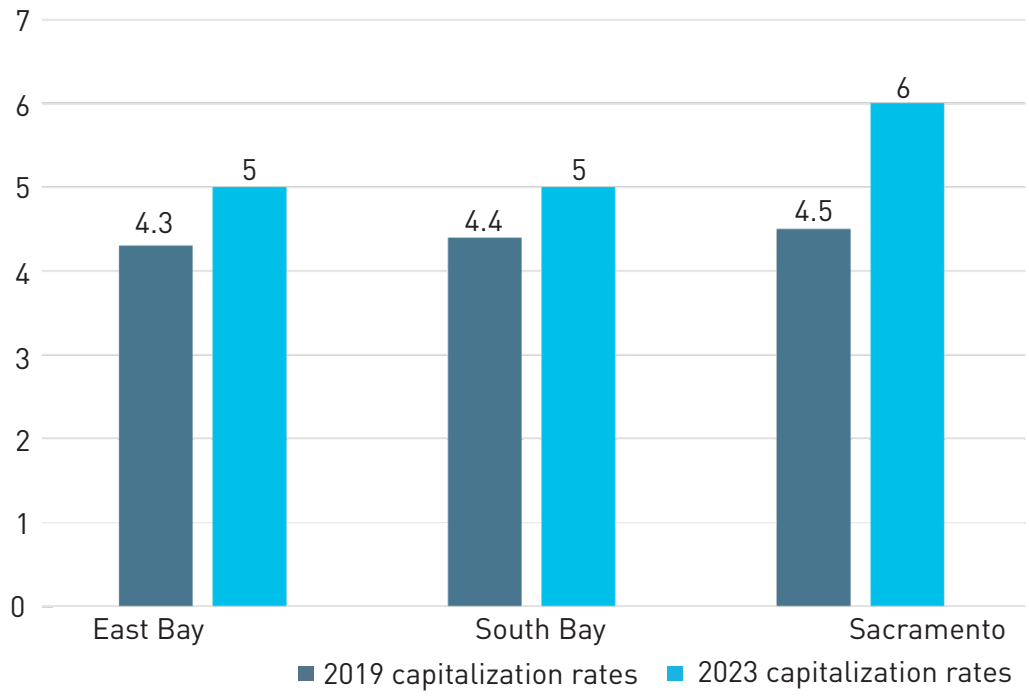
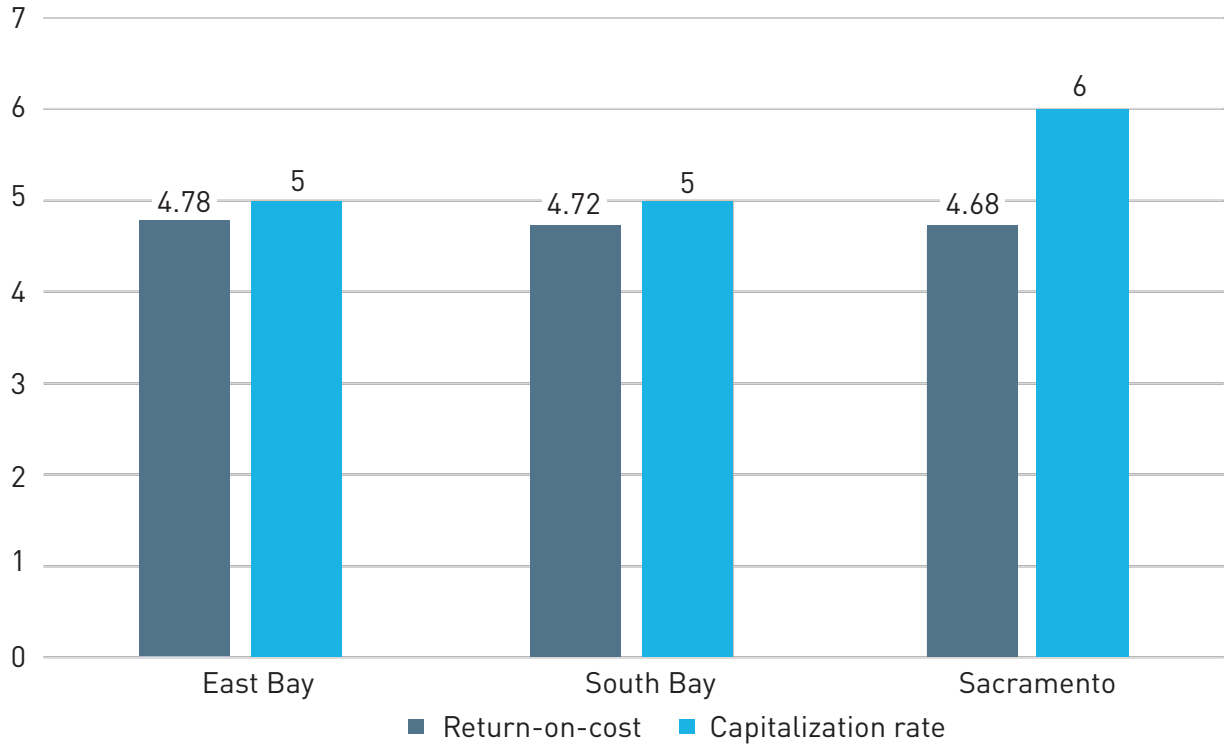


Figure 5: 2023 Return-on-Cost to Capitalization Rates in Case Study Cities



that projects that could have attracted capital three years ago with a capitalization rate/ROC spread of 0.5 now would likely have a much harder time doing so. Moreover, capitalization rates have increased since 2019 in each of our case study regions, meaning that ROC expectations must be higher as well to garner investor interest (Figure 4)

When taken together, these changes have made project viability nearly impossible for our case study pro formas. Holding our 2019 pro forma features constant and updating cost and income inputs (e.g, construction costs, rents, etc) and financing expectations, we find that our 2023 prototypes would be unlikely to get built today. In each of our case study models a comparison of the ROC to capitalization rates (Figure 5) suggests that we would be unlikely to secure the private equity required to build our projects.

That our prototypical multifamily developments are not viable has important implications for the state's housing supply shortage. Roughly ninety percent of new housing in California is built through traditional market-rate development. A slowdown in new construction would have downstream impacts on the state's long term housing supply goals of 180,000 new homes annually and would likely increase price pressures on the existing housing stock. In addition, the market and policy factors that make such prototypical new housing construction infeasible in the state's major metropolitan areas may drive new housing supply growth to other areas of the state or outside of the state entirely.

Case Study Pro Forma Characteristics

While in reality no two housing developments are the same,[2] we developed these case study pro formas to show how the math works and how the same project will have different financial fundamentals in different housing markets. Table 1 depicts the design characteristics for a large rental multifamily prototypical project including unit number, mix, parking, and retail. In addition to specific development characteristics, we also made a series of assumptions regarding site conditions as well as jurisdiction requirements (e.g., parking requirements). These assumptions are detailed in Table 2.

While we made these assumptions in order to compare financial feasibility across case study pro formas, any increase or change to any combination of these components could dramatically increase the total cost of a project, pushing it into infeasibility. For example, land that requires significant remediation of contaminated soil, or the demolition of an existing building, would increase the total cost of development. City requirements could significantly change the development math as well, such as requirements to upsize underground infrastructure (e.g,. replacing/enlarging a sewer lateral), or provide significant off-site, public right-of-way improvements as a condition of approval.

Breaking Down Costs

Three categories of costs are associated with any development project: hard costs, soft costs, and land costs. We've broken down our project prototype by these three categories in Table 3 below to explain what goes into each for typical multifamily developments.

Multifamily Prototype Pro Forma Results

Based on the characteristics and assumptions described above, we calculated the total cost of the prototype in our four markets:

- Total project costs were highest in the Bay Area, with the East Bay project estimated at a total of $80.8 million ($637,000 per unit) and the South Bay not far behind at $74.8 million ($623,000 per unit).
- Our Los Angeles prototype was estimated to be less expensive, at $71.2 million ($594,000 per unit).
- In Sacramento, the prototype was significantly less expensive at $61 million (about $508,000 per unit).

Total cost by category are broken out in Figure 6.

Project Financing

To pay for the cost of these projects, a developer will obtain funding from two sources: debt and equity. Debt provides the majority of project financing, while equity provides the balance. Both forms of funding have their own strict thresholds and requirements that a developer must meet in order to obtain money to build the project. These requirements also influence project feasibility, and can add to the overall costs of development.

Debt

Debt is provided in the form of a loan—typically both a construction loan during construction and a permanent loan once completed—from a lender (generally a bank) and carries an interest rate which the developer pays back as they draw

Table 1: Case Study Characteristics

Site Size	30,000 Square Feet
Building Size	122,364 Square Feet
Total Units	120 Units
Unit Mix	24 Studios 60 One Bedrooms 36 Two Bedrooms
Parking	120 Spaces
Retail Space	1,500 Square Feet

Table 2: Case Study Project Requirement Assumptions

No Environmental Impact Report The prototype is not required to conduct a full Environmental Impact Report, as required by the California Environmental Quality Act (CEQA) for projects that do not qualify for an exemption and are subject to discretionary review.	**No Affordable Housing Requirement** The prototype is not required to include any below-market units, or pay into an affordable housing program. Such "inclusionary housing" requirements are typical in many high-cost regions of California.
No Demolition No existing structures existed on the site that required demolition. It is rare for an infill location, as we have designed our case study, to not have existing structures on site.	**Total Impact Fees of $40,000/unit** Impact fees are fees levied on a project as a condition of approval by a city, county, or other fee-levying body (e.g. school district, municipal utility district). While we have assumed $40,000/unit for our case studies, fees can vary widely by jurisdiction[11].
No Environmental Remediation The prototype site does not require any significant remediation of contaminated soil, or other issues commonly found in urban infill locations.	**Parking Requirements** One parking space per unit is required, rather than required parking being dictated by market expectations.
No Significant Offsite Requirements There is sufficient existing infrastructure to service the prototype. The project does not need to undergo significant work in order to improve capacity for services such as water, power, or wastewater.	

Table 3: Case Study Cost Category Breakdown

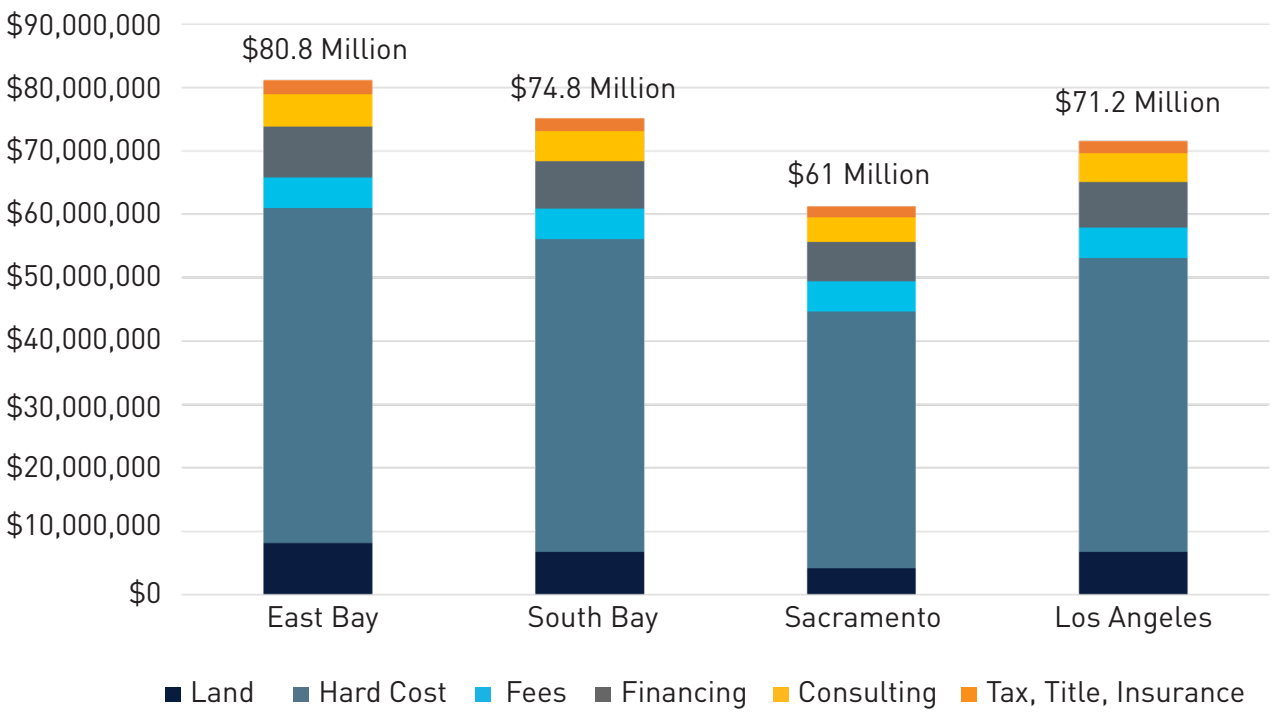
Hard Costs These are all of the costs associated with the physical construction of the project. Hard costs generally comprise two thirds of an overall development project budget.	Materials Includes everything that goes into the physical structure of the building, such as concrete, drywall, appliances, and major systems (e.g., HVAC).	Labor Includes the costs of paying the workforce in charge of all aspects of construction. This amount may vary depending on local or state program wage requirements (e.g., projects that utilize Senate Bill 423 in California requiring the use of prevailing wage). Our project does not assume prevailing wage,[12] which can add $30 per square foot to project costs.[13]	Contingency A contingency is required by financial partners to guard against cost overruns. A five percent hard cost contingency is included in our pro formas to mitigate against project overruns.
Soft Costs These costs are those associated with the design and implementation of the project, but not the physical construction (i.e. hard costs).	Fees Includes any fees required as a condition of approval for the project, such as school fees, utility connection fees, park fees, art fees, or transportation fees. There are also fees associated with the issuing of building permits. Our prototypes use a standardized total fee at $40k per unit, however total fees vary widely by jurisdiction, and are levied by different entities at different times of the project.	Consultants Includes costs associated with professional services. This includes, but is not limited to, architects; structural engineers; civil engineers, landscape architects; mechanical, electrical, and plumbing design; geotechnical engineers; joint trench consultants; waterproofing consultants; accounting; and legal.	Financing Costs Includes costs associated with obtaining debt and equity, including loan fees, closing costs, soft cost contingencies, and interest reserves. Also, our prototypes include 3 percent of total costs for a "developer fee" to pay for the developer's overhead to build and manage the project.
	Tax, Title, and Insurance Includes costs of general liability and builder's risk insurance, as well as property taxes during construction.		
Land	The cost of land should be determined by the amount of funds left over after estimating total hard and soft costs without pushing the project into infeasibility. In theory, the market value of land— and what the developer is willing to pay for it,—is driven by the "highest and best use" of what can be developed there. In reality, however, land costs are impacted by various factors, many of which are not strictly related to anticipated returns for a prospective project. For example, a property owner may hold out on selling property at the residual price to a developer for many reasons, such as continuing to operate a profitable business on the property (e.g., a surface parking lot), anticipating that the value of the land will increase in the future, or owing more on the property than what the sale profit would cover. In these and other instances, a residual land price offered by a developer may be less than what a property owner is willing to sell for. As a result, developers must choose to pay more than the residual value or not purchase the land at all. This category also includes costs associated with closing on the land, as well as due diligence reports (e.g., environmental "phase 1" or "phase 2" reporting to determine the extent to which the presence of harmful substances exist on the site). Assumes site size of 30,000 square feet.		

down funds.[3] Interest rates vary across market cycles, but for the purposes of this analysis, we have assumed a total interest rate of 8.5 percent for the construction loan and 6 percent for the permanent loan across each prototype to reflect recent interest rate increases.

Lenders examine two components when considering whether or not to provide a loan to a particular development: the developer capacity and the details of the project.[4] Developers must show that they have a proven record of success in completing projects on time and on budget, and paying back debt. Lenders also often require a developer to personally guarantee the construction loan, which means the developer may be personally liable if the project does not succeed. This puts significant risk on a developer, and may prove a barrier to developers who do not have the personal assets to sign such a guarantee.

Lenders also require supporting documentation to ensure that the project will be successful, and will not agree to fund a project or release funding until this documentation is provided. This includes but is not limited to: market studies, appraisals, environmental documents, architectural documents, and approvals from localities and agencies that have jurisdiction over development in the project's location. Developers must provide these at their own expense and risk before closing on project financing.[5] In addition to assessing a developer's track record and a project's documentation, banks require a project to demonstrate the ability to meet certain financial benchmarks.

Figure 6: Case Study Project Cost Breakdown



These financial benchmarks help a bank to determine the likelihood a project will not go into default—that projected long-term income on the project will more than cover the payments on the loans. While there are many benchmarks required by different institutions, we focus on two specific metrics: debt service coverage ratio (DSCR) and loan-to-cost ratio (LTC).

Debt Service Coverage Ratio (DSCR)

To mitigate risk, a bank requires a project to demonstrate that its income following stabilized lease-up—that is, when a certain percentage of the apartments have been successfully leased—can support the monthly loan payments over the life of the loan. This metric is measured by a debt service coverage ratio (DSCR) and is calculated by dividing the project's net operating income (NOI)[6] by the anticipated loan payment. For example, a projected DSCR of 1.0 indicates that a project anticipates achieving exactly enough income to pay its debt. However, banks require the DSCR to be higher than 1.0 for real estate lending to ensure that, if the project performs worse than expected, the developer can still meet their debt obligations. For instance, in the case of a DSCR of 1.0, any small reduction in NOI—such as higher than anticipated maintenance costs, or lower rent revenues—would put the developer in danger of not meeting their debt obligations. We have made the assumption that a lender would require a DSCR of 1.3, meaning that our projects must demonstrate an NOI 1.3 times the amount of the project loan. While this ratio appears to be standard in the regions we examined, it could be more or less depending on the specific lender's requirement.

Loan to Cost (LTC)

While the majority of funding for a standard market-rate project takes the form of debt, banks do not provide loans on the total cost of a project. To further minimize risk, banks require developers to bring in equity for the amount of the project that is not covered by the loan (described in detail in the following section). This is similar to a traditional home mortgage where a bank requires the buyer to make a downpayment of 20 percent of the value of the house. The amount that banks are willing to lend relative to the total project cost is referred to as the loan-to-cost ratio (LTC).[7] Lower LTC ratios indicate lower confidence that a project will perform as anticipated given market conditions and trends, while higher LTC ratios indicate stronger confidence in project success and ability of the borrower to pay back the loan. Typically, in California, we found that lenders currently require an approximately 55 percent LTC ratio. We use this ratio in our analysis, but as with the DSCR, the LTC ratio can vary by region, project, or bank.

Equity

After determining how much debt can be obtained, each prototype is left with a "gap" between the total cost of development and how much of the project can be financed with loans. This gap is filled by equity, which comes from project investors as well as a smaller amount of equity provided by the developer. It is important to note that this form of capital is not always specific to real estate, and can flow to other asset classes which can either provide higher returns or lower risk.

Equity investors consider housing development a riskier investment than stocks or bonds. Because of the length of time

needed to plan and build the housing before revenue is generated, as well as the myriad challenges that new housing faces (e.g., approval uncertainty and delays, unpredictable costs, market cycles, construction delays), there are many variables that could lead a project to deliver below expectations or be derailed entirely. Investors in real estate account for these risks by requiring higher levels of return, and as a result developers must demonstrate that they can achieve sufficient returns to justify the risk.

Equity investors in residential real estate come in various forms, and are not exclusively private equity investment firms. Depending on the size and experience of a developer, private equity is obtained from insurance companies, foreign capital, and the pension funds of public sector employees and union members that utilize real estate development investments as "high return" options to round out their overall portfolios. This means developers must deliver equity returns which are dictated as much by global markets as by local conditions, and often do not relate to how much profit a developer makes from a project.

A developer gains equity by contributing a portion of their own capital as well as their time to develop and manage the project (also known as "sweat equity"). The percentage of developer equity is generally a much smaller percentage than that of the investors. Profits received by a developer are not realized until at minimum their loan has been repaid, and once the investor has received their preferred return. In most cases, developers will not see profit until equity is fully returned to investors. The developer is generally the last interested party to receive any profit from a new housing development, and most developers shoulder a significant amount of risk and cost (e.g., obtaining full project approvals) even before any form of financing is secured.

Project Rents

New developments derive the vast majority of their income from rents charged to tenants.[8] To demonstrate to financial partners what their project's anticipated rent will be, developers must commission a detailed market analysis from private consultants. These consultants use proprietary data sources to determine the demand for new housing in the project area, comparable rents in nearby projects, and what a developer could expect to receive in rents. A developer uses these numbers to complete their pro forma and to prove to lenders and investors that their project will receive enough income from rents to justify their financing of the project. If developers cannot produce evidence that they can achieve rents high enough to satisfy both lender and investor requirements, they will not receive financing. Rents for each of our projects were determined by assessing area rents in similar new projects. These rents are illustrated below in Table 4. In each case, given the high cost of development, the rents required to make the project financially feasible are higher than what most renter households in each region can afford. When compared to income levels of renter households in each region, the minimum rents for a two bedroom unit are only affordable to those with the region's highest incomes.[9]

Table 4: Rent Ranges for Prototype New Construction Per Square Foot (Studios to Two Bedrooms)

East Bay (e.g., Uptown and Downtown Oakland)	South Bay (e.g., Rose Garden, North San José)	Sacramento (e.g., Midtown, Downtown)	Los Angeles (e.g., Santa Monica, West Los Angeles, Westwood)
$5.70 - $4.80	$4.85 - $4.50	$4.00 - $3.25	$5.30 - $4.40

Measuring Return

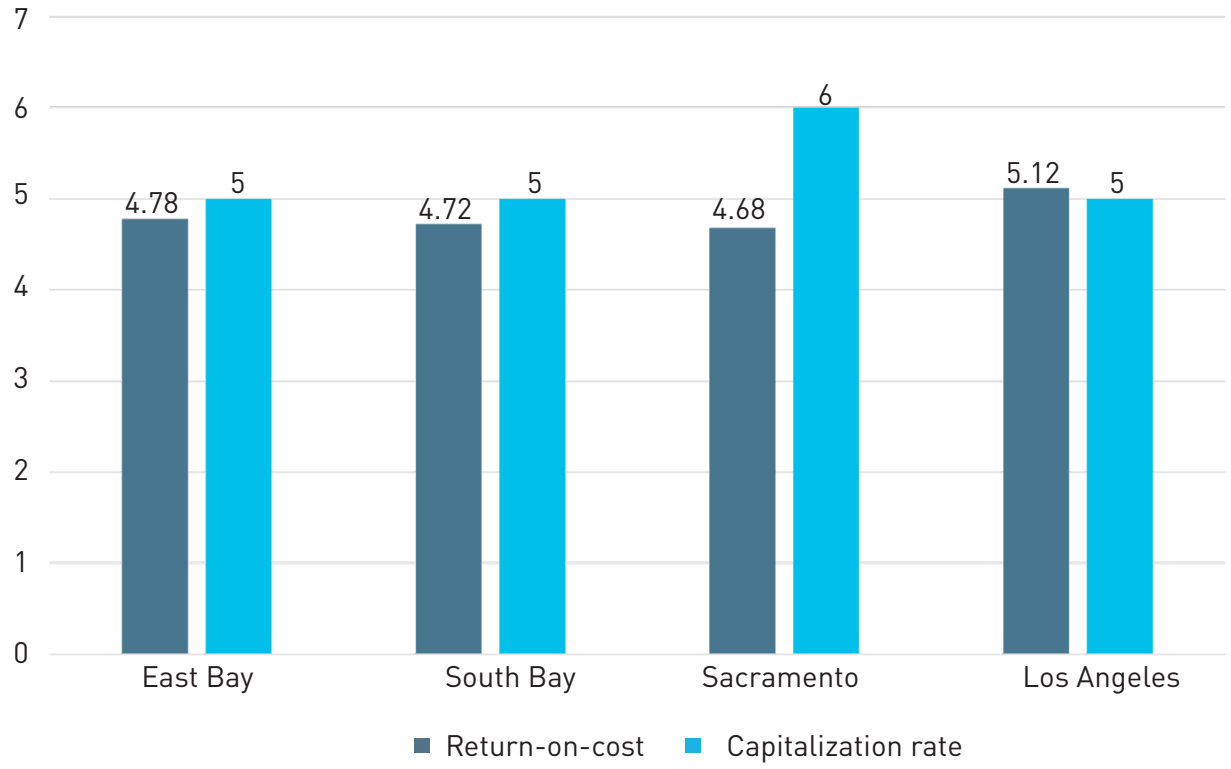
With income and expenses set, a developer can then determine how much money the project could make, and measure that against return expectations of investors. The form of equity financing is critical in determining whether a project gets built. Ultimately, a developer will make a decision to move forward with a project based on whether they can achieve threshold return requirements that will allow them to attract equity. While there are several ways to measure return, the simplest metric is to compare a project's anticipated ROC to local area capitalization rates.

The ROC can be used to compare returns across various investment types. In real estate development, ROC measures the expected return after accounting for the cost to build and manage a new housing development. This metric is determined by dividing a project's anticipated NOI by total project cost. Capitalization rates, on the other hand, measure the return one can expect by purchasing a certain property at current market prices. Essentially, by comparing ROC-to-capitalization rates, a developer is measuring the projected return of building a new development against the projected return of buying an existing building. If the project's ROC is reasonably above the capitalization rate for similar buildings in the area, then a developer will move forward. To put it another way, a developer will not go through the time and expense of developing a new project if it will not yield a higher return than they would receive by buying an existing property in the area.

We use this ROC-to-capitalization rate comparison to determine feasibility for each of our projects. The extent to which a project ROC must surpass capitalization rates to achieve feasibility changes according to the region, project type, and investor (including their views on timing relative to the market cycle). To determine this variable, we spoke to developers in each market. Based on these conversations, we determined that a minimum spread of between 1.0 and 1.5 percent is required. ROC is determined by dividing a project's Year 1 NOI by total project cost.

As illustrated in Figure 7, each project's ROC varied, and no prototype in 2023 appears to be close to feasibility based on our baseline market and policy inputs. For our two Bay Area projects, both ROCs were nearly a quarter of a percent lower than anticipated capitalization rates.[10] In Los Angeles, our prototype was closer to feasibility, with a ROC slightly higher than capitalization rates, but well short of the 1.0 ROC to Capitalization rate spread needed to reach a bare minimum threshold for feasibility. In Sacramento, the project had a negative gap of more than 1.0.

Figure 7: Case Study Return on Cost to Capitalization Rate Comparison



Beyond ROC, investors use other metrics to determine their interest in a project. For example, another common metric is internal rate of return (IRR). IRR measures an investor's total anticipated return over the life of their investment (as opposed to the Year 1 return, as measured by ROC). Specifically, the IRR is calculated by considering total equity invested and the anticipated annual cash flows for the number of years an investor expects to hold the property (generally 10 years) with the anticipated value at sale. Depending on the type of investor, IRR requirements can fluctuate significantly. For example, some investors will only invest in projects whose IRRs exceed 20 percent (e.g., a high-yield investment fund) while other funds may be comfortable with projects with IRRs closer to 15 percent. The IRRs demonstrated by our projects are 10.9 percent for the East Bay, 10.7 percent for the South Bay, 10.7 in Los Angeles, and 10.6 Sacramento (Figure 8). These IRRs would likely be considered very low by most, if not all, traditional forms of equity investment.

Does The Project Pencil?

Based on our baseline variables and market conditions we observed at the time of our analysis in each of our four prototype areas, it is highly unlikely that any of these projects would pencil. As illustrated in figure 9, none of our projects provide an acceptable rate of return to attract investment.

Policy Changes Move Prototypes towards Feasibility

While our baseline prototypes do not demonstrate project feasibility due to high construction costs and stagnant rents for new homes, there are some policy changes that could get these projects closer to feasi-

Figure 8: Case Study Internal Rate of Return 2023

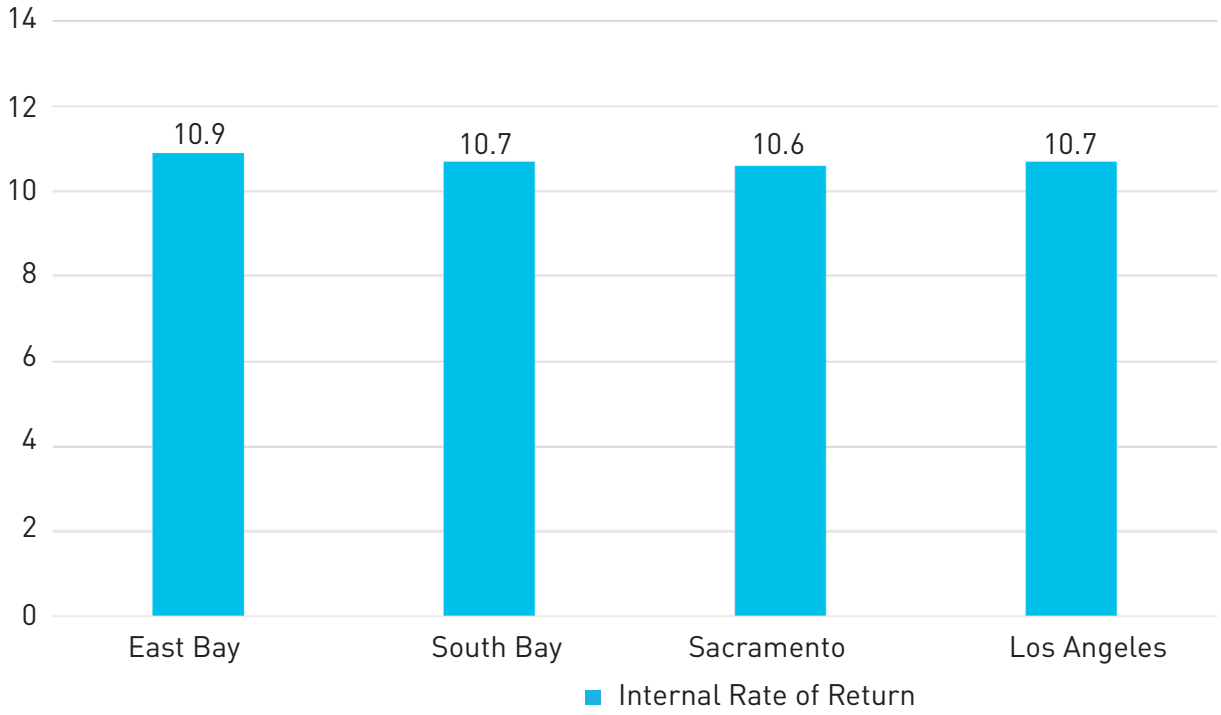
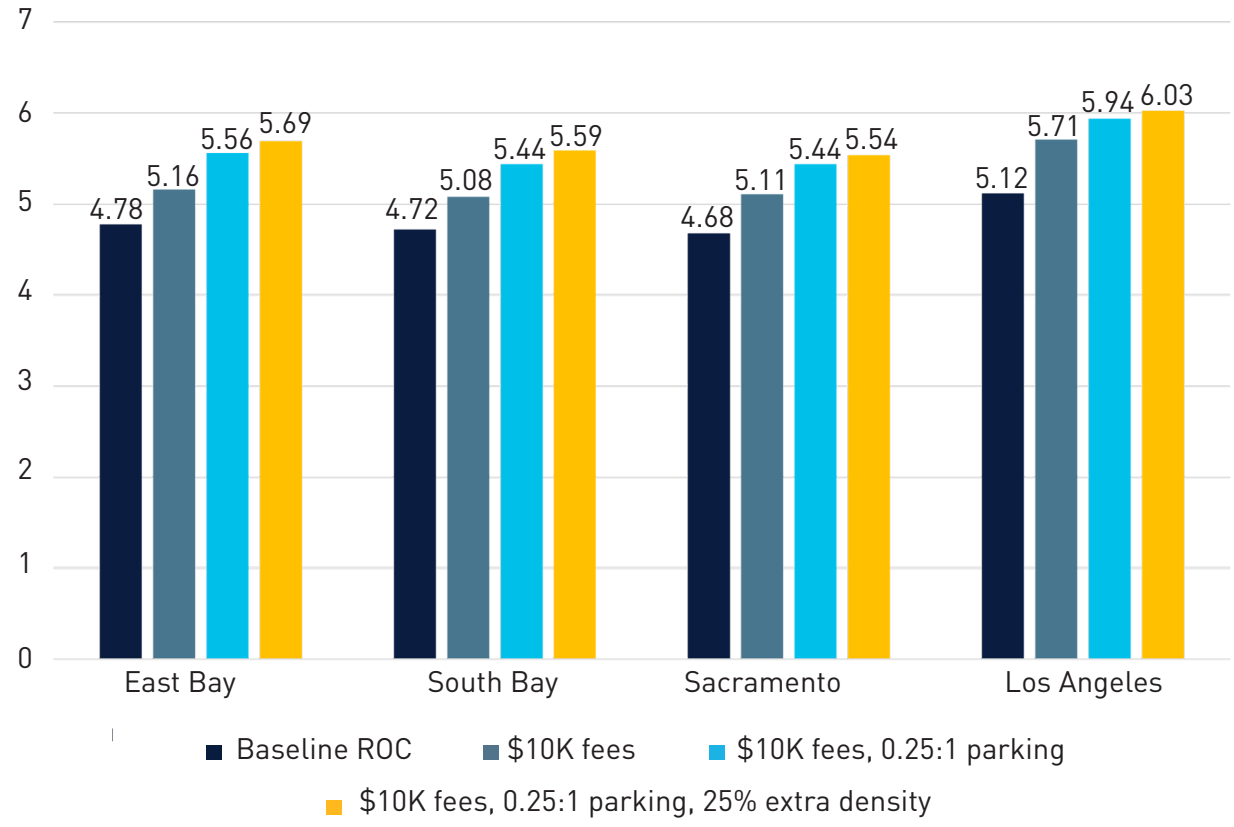


Figure 9: Cumulative Case Study Policy Change Impacts on Return on Cost



bility. Specifically, policymakers have the ability to lower costs by reducing requirements for parking, lowering impact and permitting fees, and allowing for increased density. We recalibrated the cumulative impact of these inputs in Figure 8 to demonstrate the impact on feasibility. We tested specific policy changes such as: lowering total impact fees ($10,000 total per unit), reducing parking requirements (0.25 spaces to each unit), and adding an increase in density (25 percent above baseline, or 30 extra units spread evenly amongst unit type). While no single policy change was likely to move a project from infeasible to feasible, the total combination of changes gets our case study pro formas much closer to penciling. Understanding the relationship between such policy changes and the impact on project feasibility is important as policymakers consider strategies to support housing construction through a market downturn and recalibrate policies to support new projects once market conditions improve.

In the East Bay and South Bay, these changes move our case study pro formas much closer to project feasibility. In the East Bay, this combination of changes moves the case study to 0.69 ROC-to-cap-rate spread, and in the South Bay it is 0.59. While still shy of the minimum 1.0 ROC-to-cap-rate spread that we are using to determine feasibility, the policy changes put each of our projects in a stronger position to pencil once market dynamics become more favorable, such as when interest rates or hard costs decline, or rents for new construction increase. In Los Angeles, the policy changes brought our prototype above the 1.0 ROC-to-cap-rate threshold, making it much more attractive for equity investment. In Sacramento, our project was still below the six percent area capitalization rate, though as with the South and East Bay projects, has moved closer to feasibility than the baseline models.

While impactful, these changes may not be politically feasible, and each has their own tradeoffs. For example, reducing impact fees may assist in bringing the projects closer to financial feasibility, but may come at the expense of raising city revenues for critical infrastructure or affordable housing. That said, those revenues would not come in at all if projects cannot obtain financing because of high costs. Policymakers should consider these tradeoffs and compare them to the need to create new homes.

Conclusion

Building new housing is complex and costly, and understanding the process developers follow to build it is important for determining what policies can help encourage new construction as part of efforts to alleviate the housing shortage. As demonstrated by our pro forma analysis, there are dozens of inputs and requirements that directly impact the cost to build new housing and the amount at which new housing can be offered to renters and buyers. In the current market, understanding why new development is unlikely to take hold is important as policymakers consider changes to restart growth both in the near term and also for when market conditions become more favorable for homebuilding, such as following interest rate decreases or declines in construction costs. Policymakers at all levels of government should be cognizant of how requirements intersect with the math behind housing development and should proactively consider existing policy priorities in the context of the need to increase housing supply. For example, the City of San Francisco recently implemented a series of changes, including lower fee and affordability requirements, in a recognition that new housing construction was a top priority for the city. Thoughtful approaches to balancing various priorities are required to ensure that these policies can work with new housing development rather than against.

The Terner Center has shown that tools can be created to provide these insights for decision-makers. In addition to the pro forma analyses presented in this brief, understanding the impacts of policy changes not just on any individual project's feasibility but on new supply across a whole jurisdiction is also critical, especially in the context of required Housing Element plans. Terner Labs' Housing Development Dashboard is an important companion to the static analysis presented here; allowing users to examine overall housing growth impacts at the neighborhood or jurisdictional level from various market and policy changes, creating an estimate for likely new homes to be built. This tool is currently being used for policy analysis in the city of Los Angeles, and will soon be onboarded by city planning staff in cities such as San Francisco, San José, San Diego, and others.

As local, regional, and state policymakers endeavor to increase housing supply and affordability, data-driven assessment is critical for a better understanding and evaluation of the potential outcomes of different policy choices.

ENDNOTES

1. CBRE. (2022). 2022 U.S. Construction Cost Trends. Retrieved from: https://www.cbre.com/insights/books/2022-us-construction-cost-trends.

2. Even within a similar building type, development characteristics are dictated by lot size and shape, as well as local city zoning standards, such as setbacks, lot coverage, and allowable density or height, among others.

3. There are two types of loans necessary for rental housing projects: a construction loan, which is the loan used to pay for the construction of the project and typically higher in interest rate, and permanent debt, which is the long-term mortgage on a finished project. Once construction is complete, a lender will "take out" the construction loan (i.e. pay off) and replace it with a fixed-rate permanent loan. The permanent debt cannot be obtained until the project has been completed and reached financially sustainable occupancy at rent levels that support the debt.

4. Peiser, R. B. & Hamilton, D. (2012). Professional Real Estate Development: the ULI Guide to the Business. Third Edition. p. 64-65, 209. Urban Land Institute.

5. The loan will also include a "not to exceed" amount, as well as contingency amounts for unforeseen issues (i.e. cost overruns).

6. Net Operating Income is defined as project income derived from rents minus expenses of operating the property (i.e. maintenance, leasing, property taxes, legal, staff) before paying debt.

7. Loan-to-value (LTV) is another metric by which banks will measure the amount they are willing to lend. While similar to LTC, LTV sizes the loan relative to the finished value of the project, rather than the project cost.

8. Income is also derived from parking charges, retail rent, and other sources.

9. "Affordable" is determined by calculating 30 percent of income for housing costs.

10. These percentages are commonly referred to as basis points, or BPS. One basis point is equal to 1/100th of 1 percent (or 0.01 percent)

11. Raetz, H., et. al. (2019). "Residential Impact Fees in California." Terner Center for Housing Innovation at UC Berkeley. Retrieved from: https://ternercenter.berkeley.edu/blog/residential-impact-fees/.

12. Prevailing wage requirements mandate that any contractor working on a project pay a predetermined wage rate. These wages are generally required on projects that utilize public subsidies, such as with many affordable housing projects, or in instances where the developer has negotiated with local stakeholders to pay prevailing wages.

13. Raetz,H., et. al. (2020). "The Hard Costs of Construction: Recent Trends in Labor and Materials Costs for Apartment Buildings in California." Terner Center for Housing Innovation at UC Berkeley. Retrieved from: https://ternercenter.berkeley.edu/research-and-policy/hard-construction-costs-apartments-california/.

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The Terner Center formulates bold strategies to house families from all walks of life in vibrant, sustainable, and affordable homes and communities. Our focus is on generating constructive, practical strategies for public policy makers and innovative tools for private sector partners to achieve better results for families and communities.

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