

Zoning, Housing, and Economic Growth in San Francisco

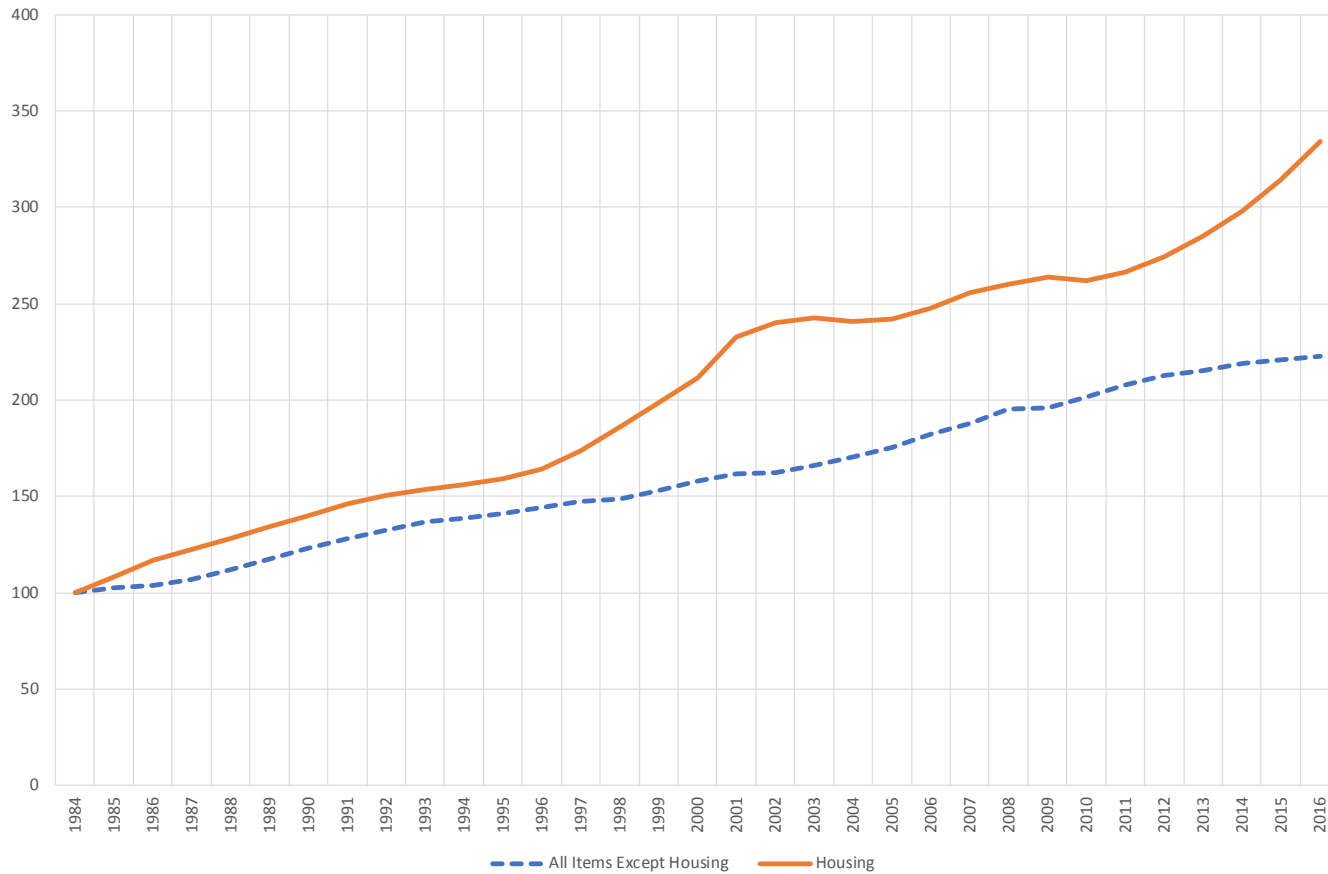
Ted Egan, Ph.D., Chief Economist
Office of the Controller
City and County of San Francisco
August 28, 2019

Some Background on the Question

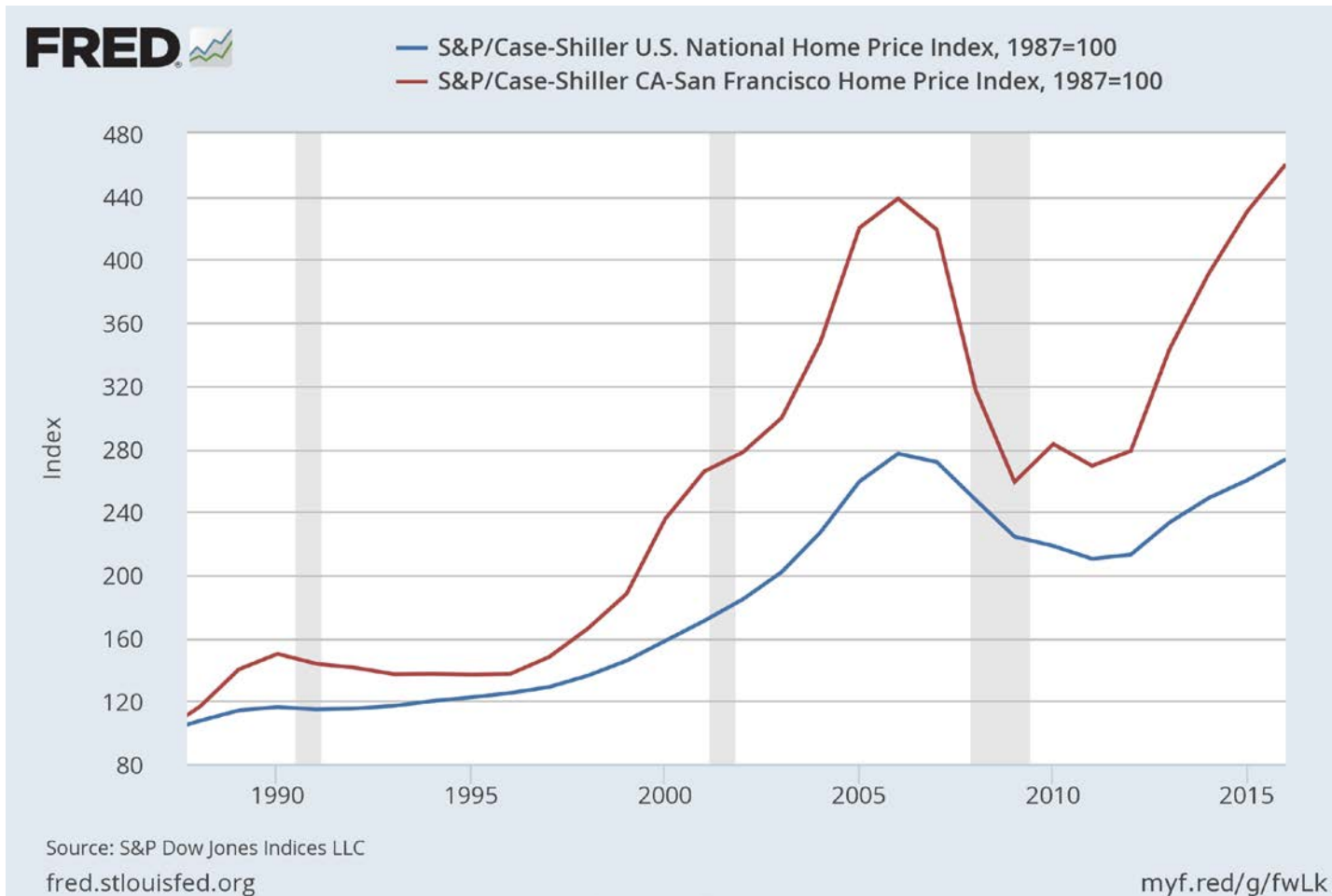
- San Francisco has been one of the 2 or 3 fastest-growing cities in the U.S. this decade.
- Land use – particularly new housing construction – is heavily regulated in the city, and has been since the 1970s.
- Housing prices in the city of San Francisco have grown – by some measures – 9% per year on average since the late 1990s.
- Combination of high housing prices and rapid economic growth in coastal MSAs – especially the Bay Area – blamed for structural unemployment, depressed labor force participation rates across the U.S.
 - Hsieh & Moretti (2017)– Restrictive land use regulation in New York and the Bay Area depressed U.S. GDP growth by 50% since the mid-1960s.
- We were asked the question: How does San Francisco’s zoning controls affect the city’s economy?
- Unlike the Hsieh/Moretti research, which uses the Wharton development index to do cross-sectional analysis, we have more detailed zoning information, but for only 1 city.
- So, along with our own research, we used REMI to answer the question with a lot of policy specificity, for one city.

SF Bay Area Housing CPI vs Other Commodities

Bay Area Price Inflation for Housing, and All Other Items, 1984-2016
(1984=100)



Case-Shiller: SF vs. U.S. Average



Methodology

1. Estimate how changing specific zoning policies increases the likelihood of developing new housing on each land parcel in the city.
2. Translate higher housing likelihoods into an increase in housing supply, reduced housing prices, and increased construction spending.
3. Estimate the negatives of new housing: loss of existing uses, congestion effects on housing values.
4. Use REMI to reconcile the benefits and costs of changing zoning controls.

1. Building a Development Model

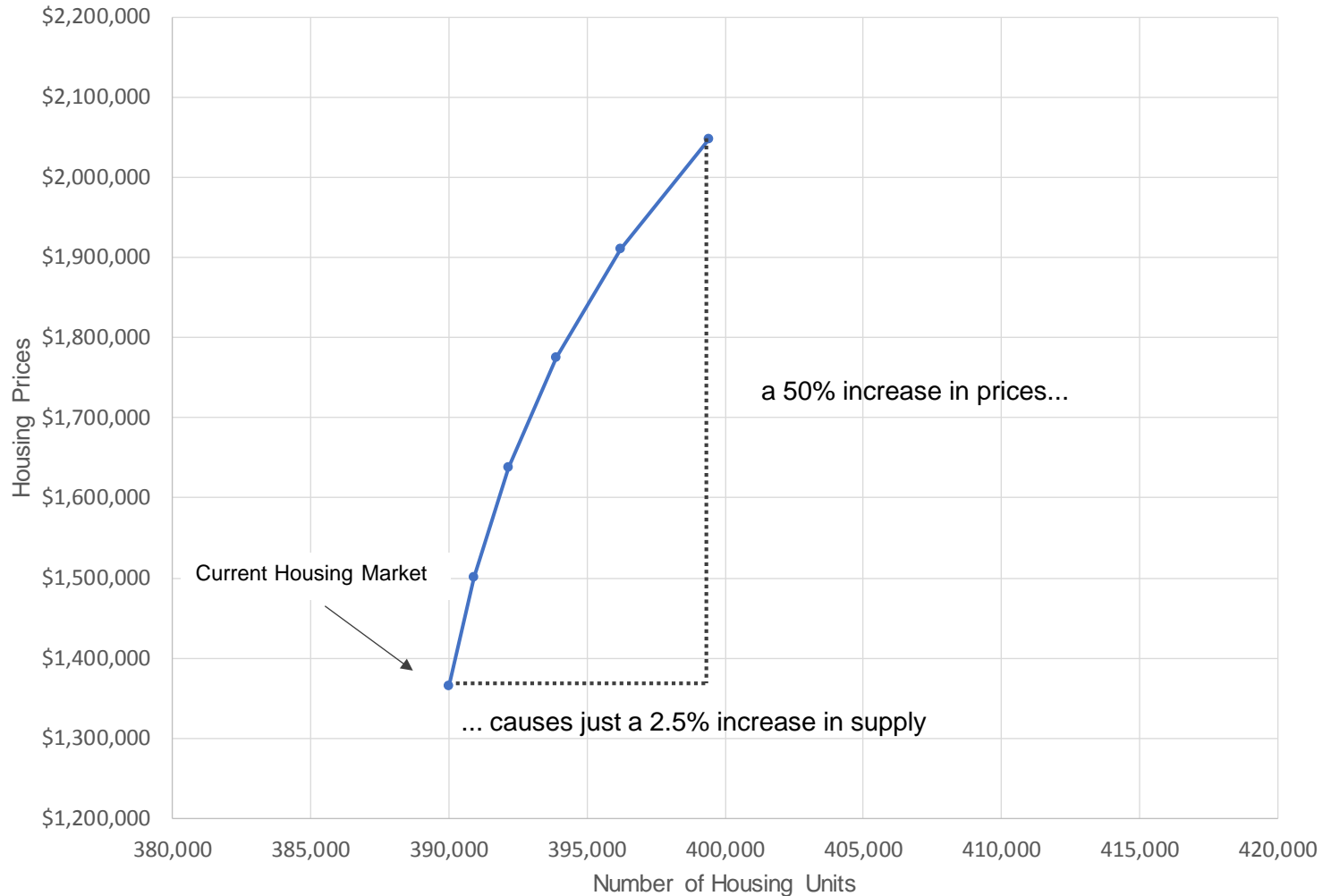
- We started with 15 years of history on where and when housing was built on land parcels in San Francisco. This yes/no was the dependent variable.
- Out of about 200,000 parcels in the city, housing was built on about 350 of them from 2001-2015.
- All the parcel/year combinations were characterized with site variables (e.g. area, existing use, location), market variables (prevailing housing prices, interest rates, indicators of housing demand in that year), and zoning variables applicable to the site (allowable uses, historic preservation, maximum heights etc.).
- These variables were used to build a logistic regression that let us estimate the particular impacts of the zoning policy variables on the likelihood of development, on each parcel in the city.
- In other words, we could see which policies “matter”, and how changes to these policies would affect the likelihood of development of housing on each parcel in the city.
- By summing the changed expected production of housing across every parcel in the city, we can estimate how overall housing production in the city would change in response to a change in the variable.

Significant Variables in the Model

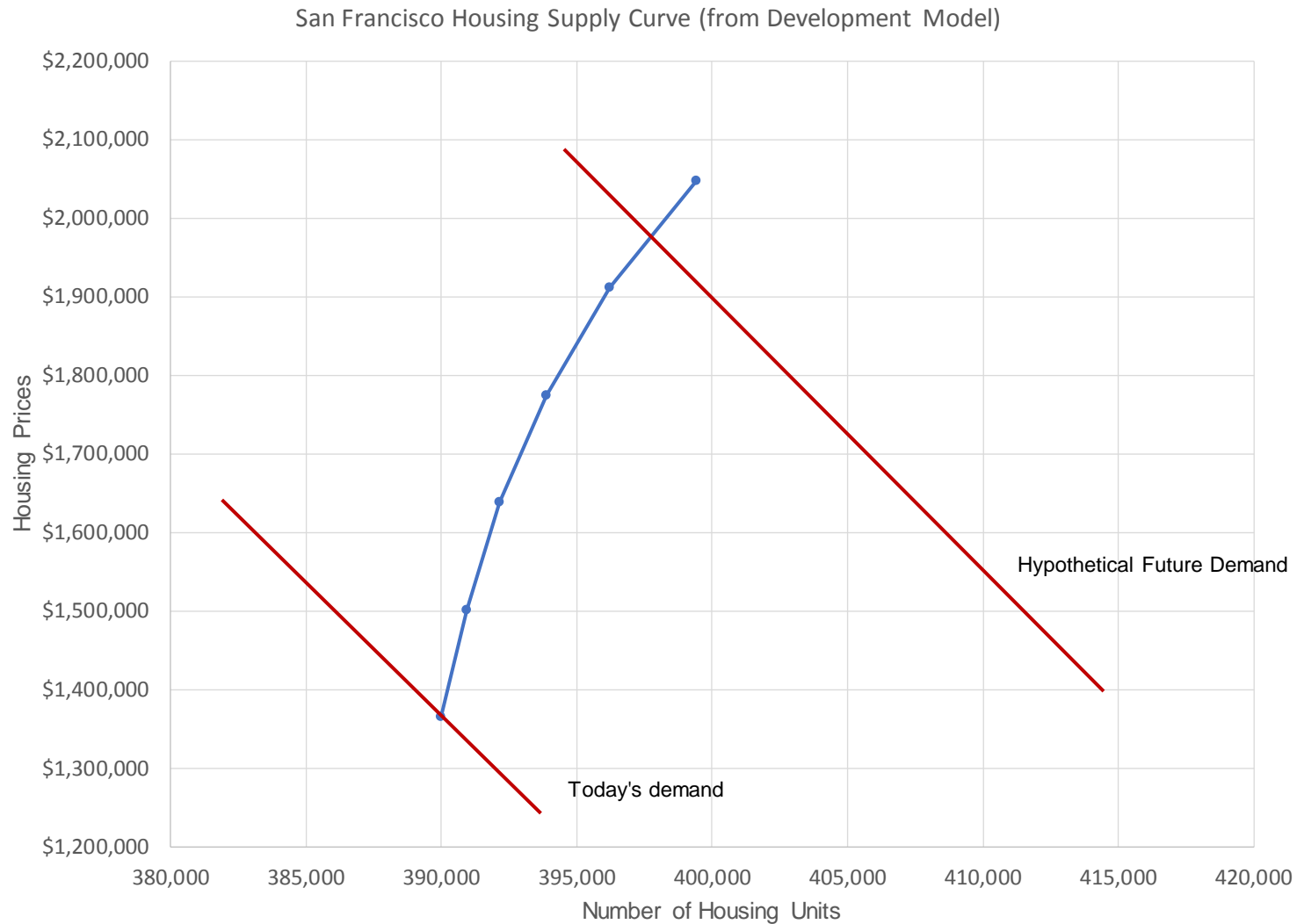
- The following variables were found to significantly affect the likelihood that a parcel added housing in San Francisco:
 - Overall housing prices (positive)
 - Overall construction costs (negative)
 - Whether or not the parcel was currently vacant land (positive)
 - Parcel's distance from downtown (negative)
 - Ratio of maximum development capacity under current zoning (height & bulk) to size of existing property on parcel (positive)
 - Whether the parcel contain historic resources (negative)
 - A number of dummy variables representing different use districts (negative, relative to a very permissive use district used as a default)

The Price / Quantity Dimensions of the Model Trace Out a (Very Inelastic) Supply Curve for Housing

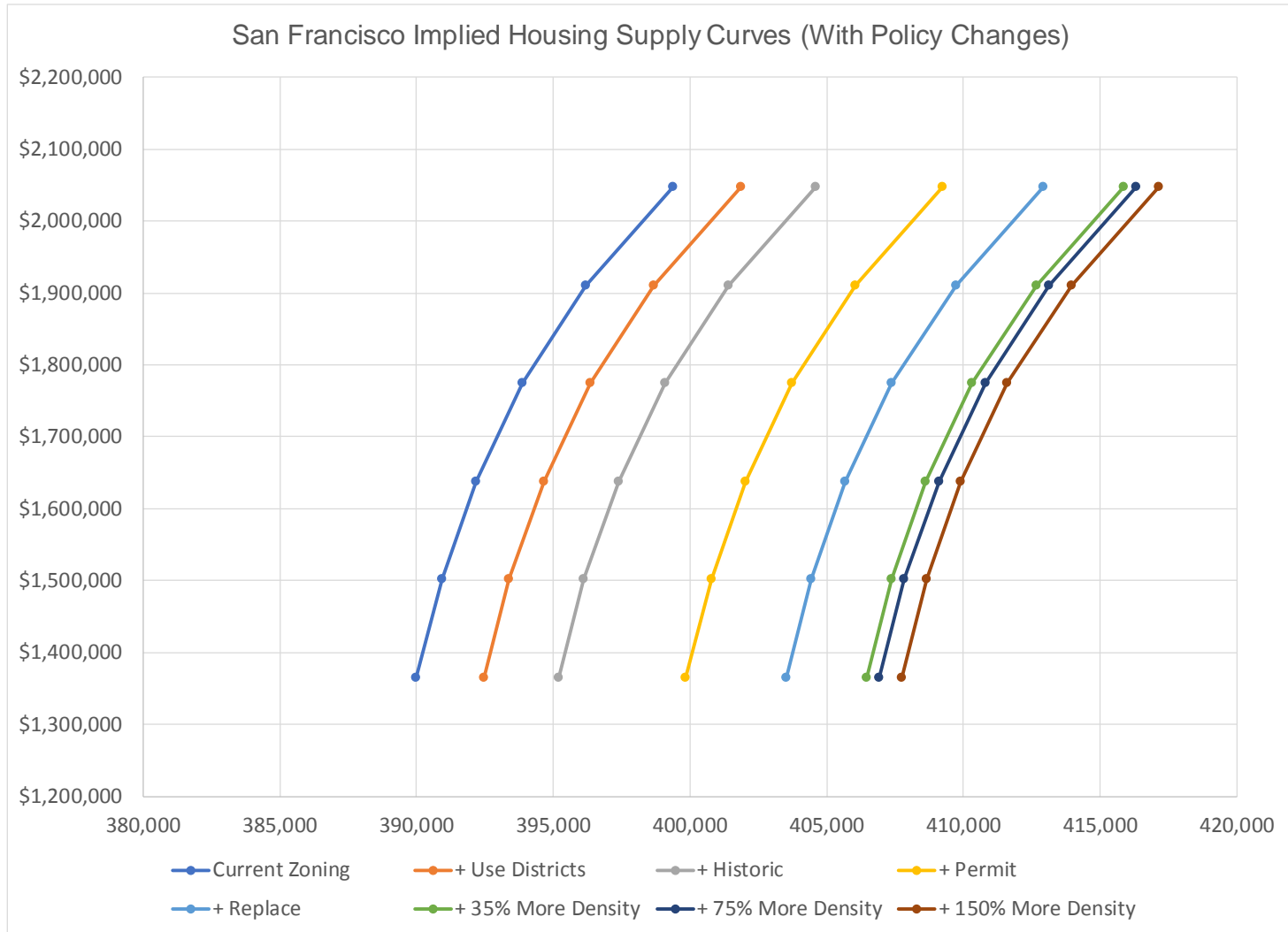
San Francisco Housing Supply Curve (from Development Model)



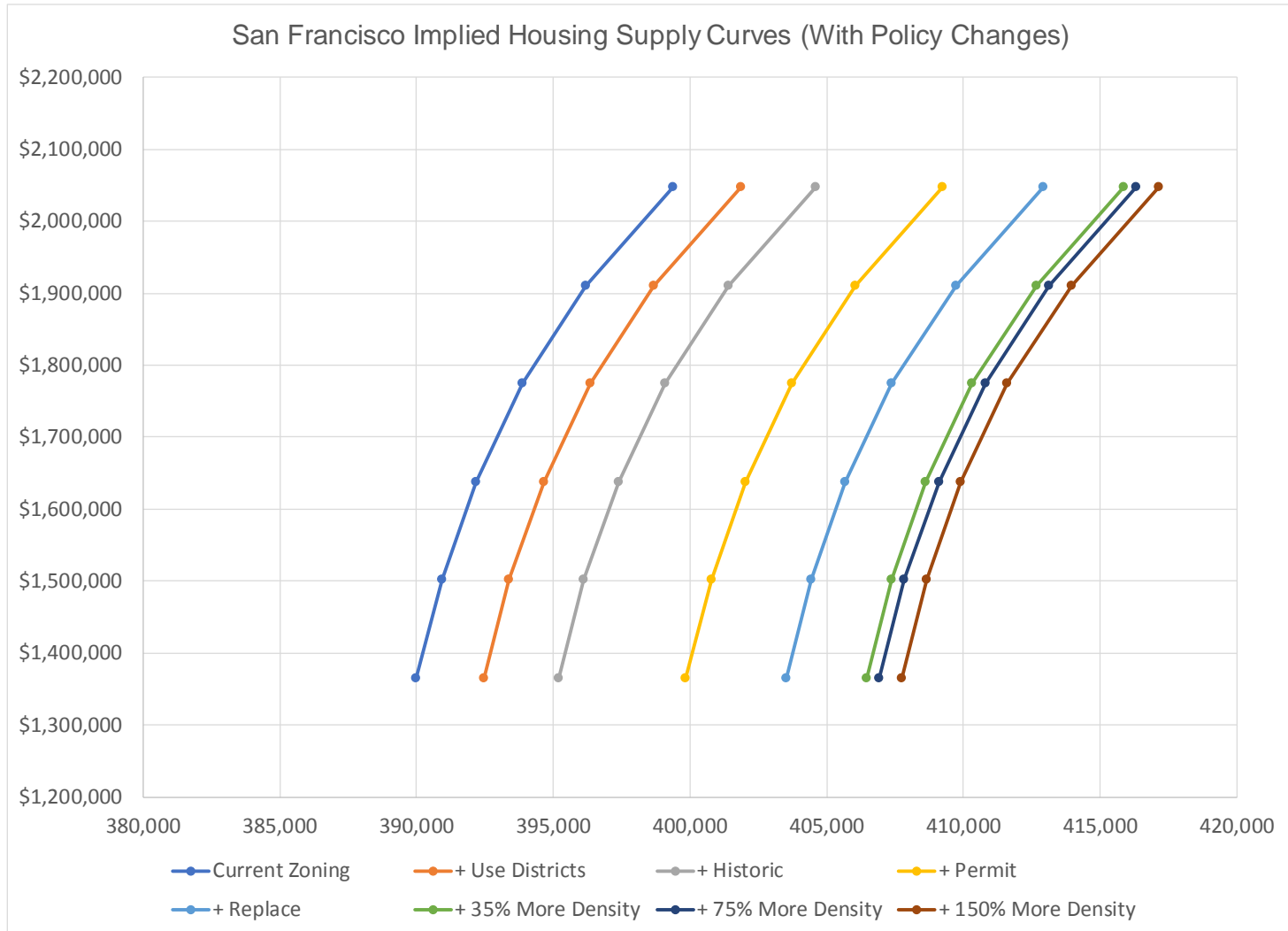
So Economic Growth, Which Raises Housing Demand, Leads to a Big Growth in Prices, and Little Growth in Housing Supply



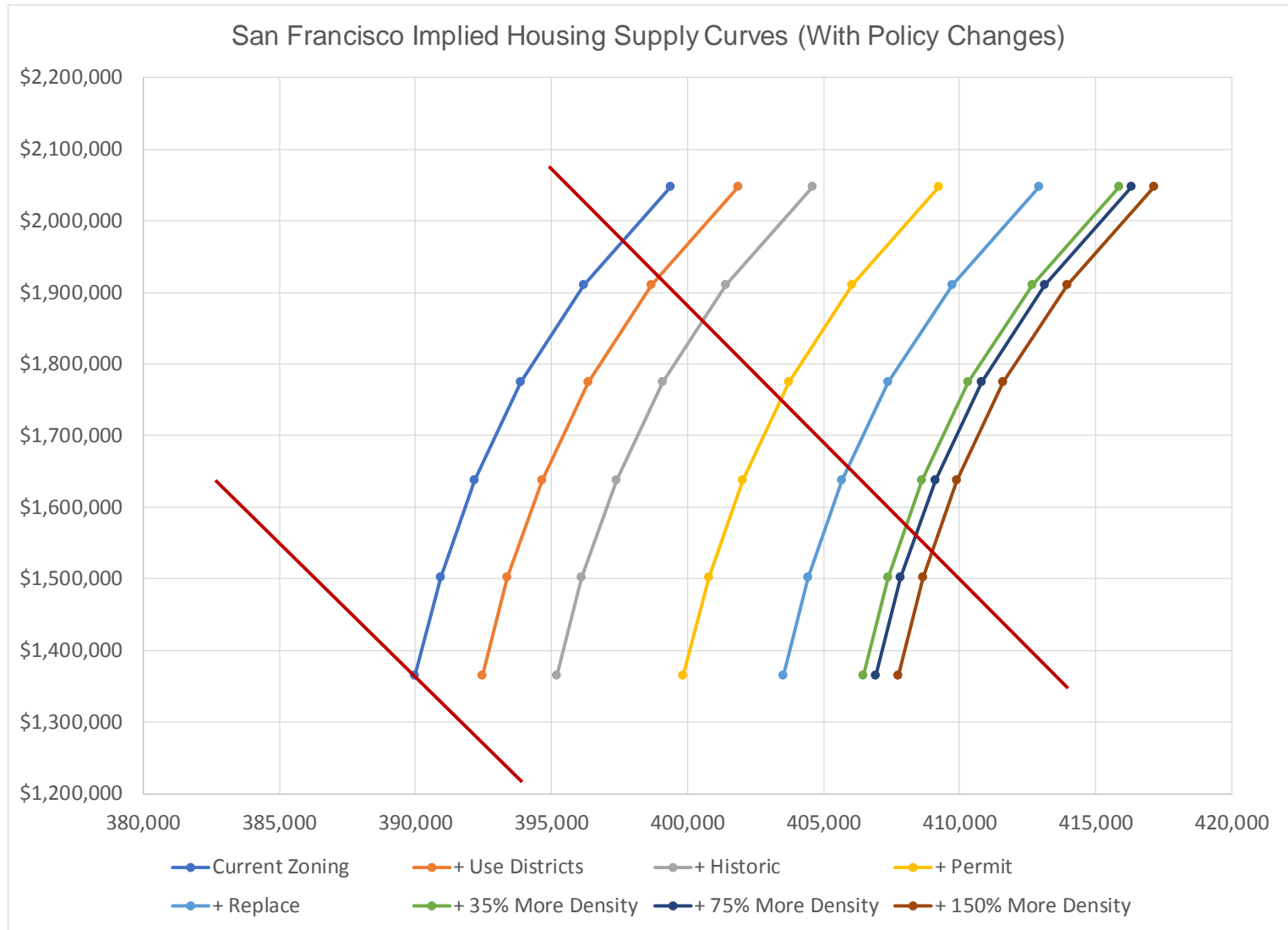
The Model Results Suggest That Some Land Use Policy Changes Would Lead to Structural Shifts in the Housing Supply Curve...



The Model Results Suggest That Some Land Use Policy Changes Would Lead to Structural Shifts in the Housing Supply Curve...



...And Different Housing Market Outcomes: Lower Prices and More Production



2. Getting to the Impact on Housing Prices and Construction Spending

- The model lets us see how potential zoning changes affect the likelihood/probability of development across the city.
- Multiplying these changes in probability by the capacity of each parcel, and adding them up across the city, yields city-wide changes in housing supply associated with zoning changes.
- Using ACS PUMS data, we estimated the price elasticity of demand for housing in the city, and the supply elasticity using building permit data.
- Based on this, a 1% increase in housing supply in San Francisco leads to a 1.4% decrease in housing prices.
- In addition, hard construction costs in the city are about \$250/sf for housing, so there is a construction industry benefit associated with rezoning as well.

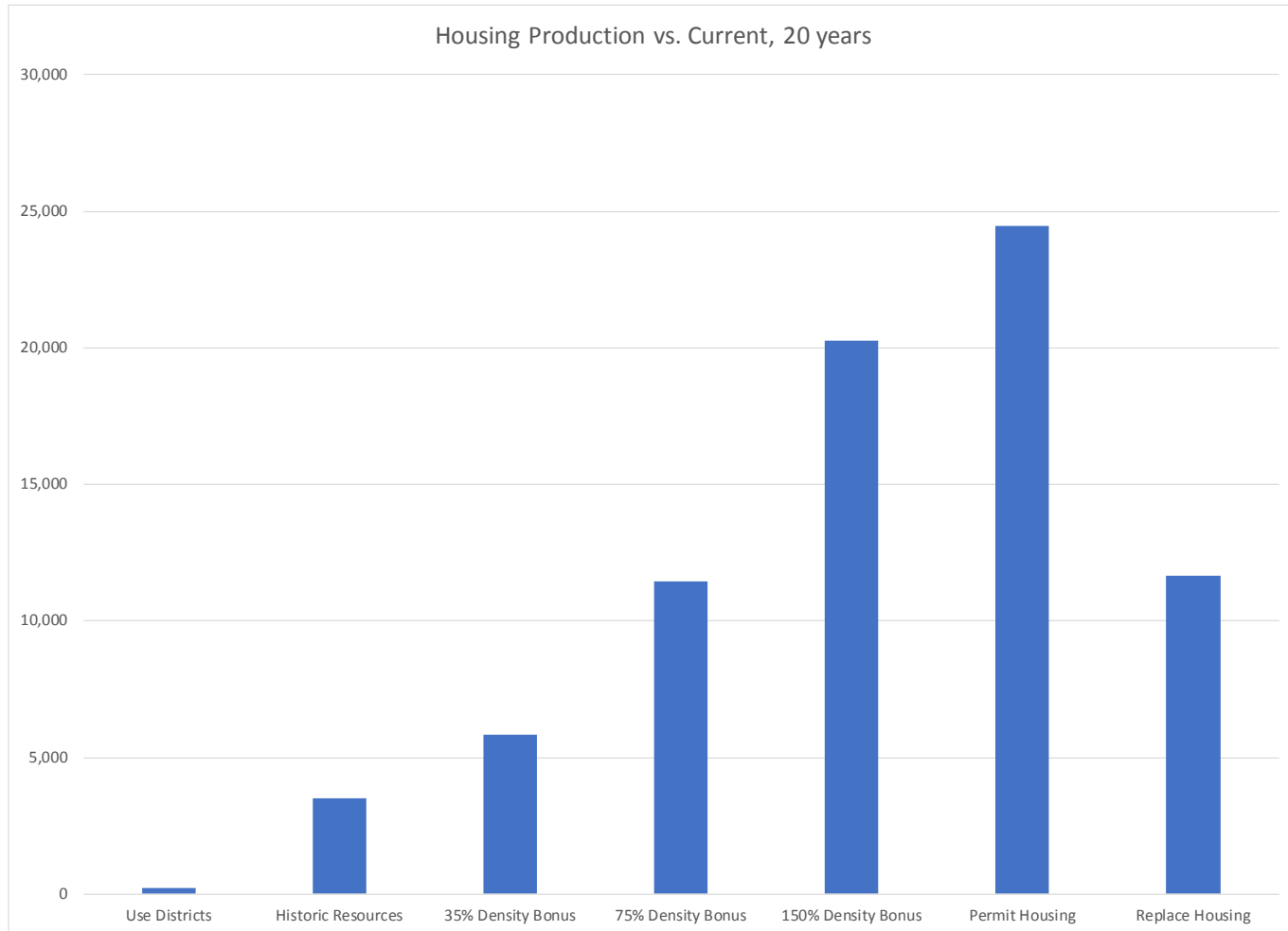
3. Negative Impacts of Building More Housing

- Two negative impacts were also considered, in addition to the benefits of reduced housing prices and increased construction spending.
- In San Francisco, there are very little land left for new housing development. Much existing residential and non-residential development is effectively protected by zoning controls, but if they were relaxed, some of that activity would be lost to demolition when new housing is created.
- This loss needs to be accounted for in REMI.
- Secondly, based on hedonic modeling we have done that looks at the impact of proximity to new housing on existing home sale prices, more housing would negatively impact residential property owners—not just because of increased competition, but because home buyers in San Francisco appear to bid less for existing homes that are near new homes.
- This negative amenity effect also needs to be accounted for in REMI.

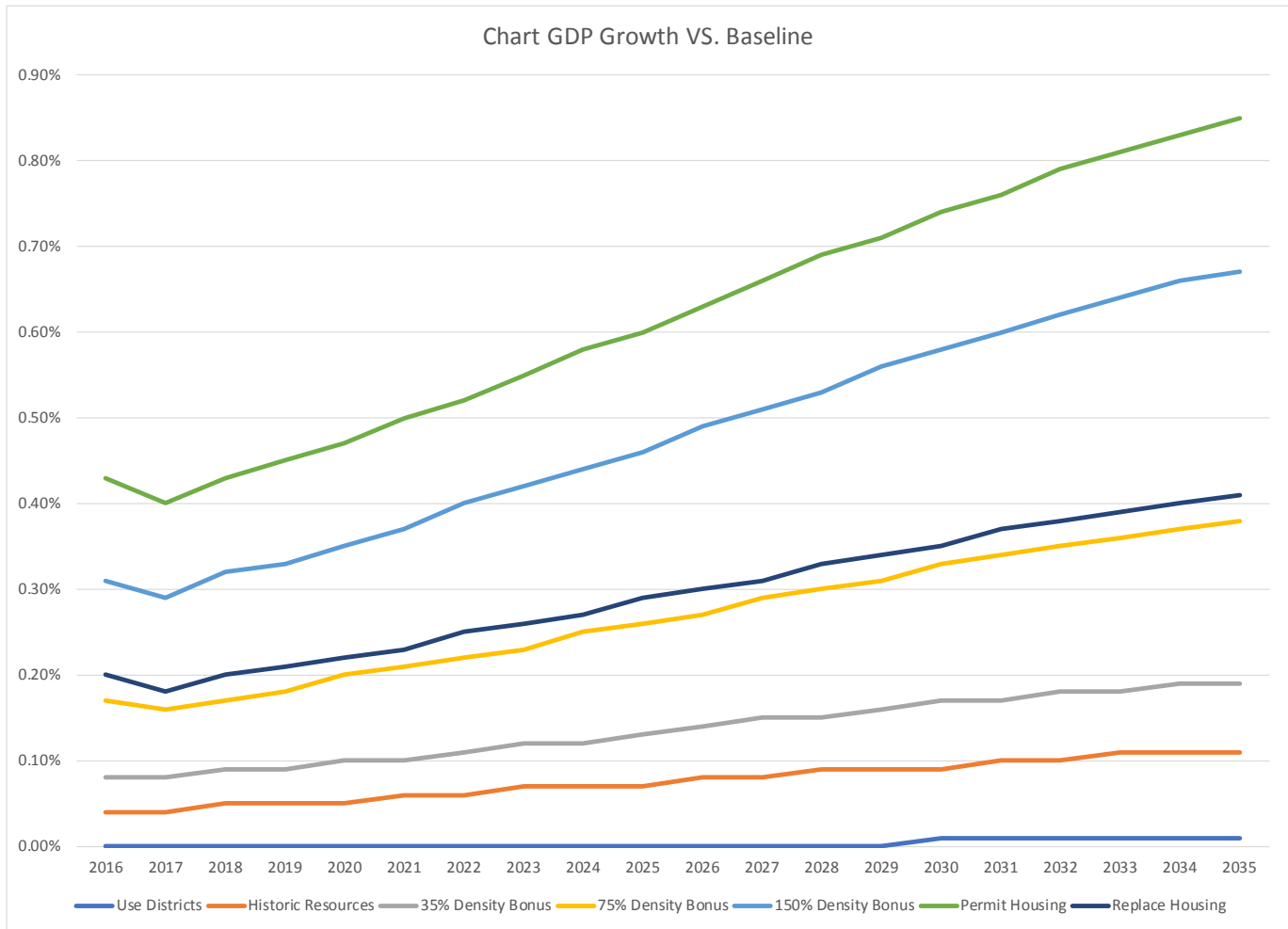
4. Putting It Together

- We designed 7 (very hypothetical) policy changes to explore the impacts and the capabilities of the approach.
- For each one, we estimated:
 - Net increase in housing production
 - Housing price effect – REMI PV
 - Increase in Optimal Regional Residential Capital Stock – REMI PV
 - Loss of existing non-residential activity – REMI employment PV
 - Negative amenity effect – REMI non-pecuniary amenity PV

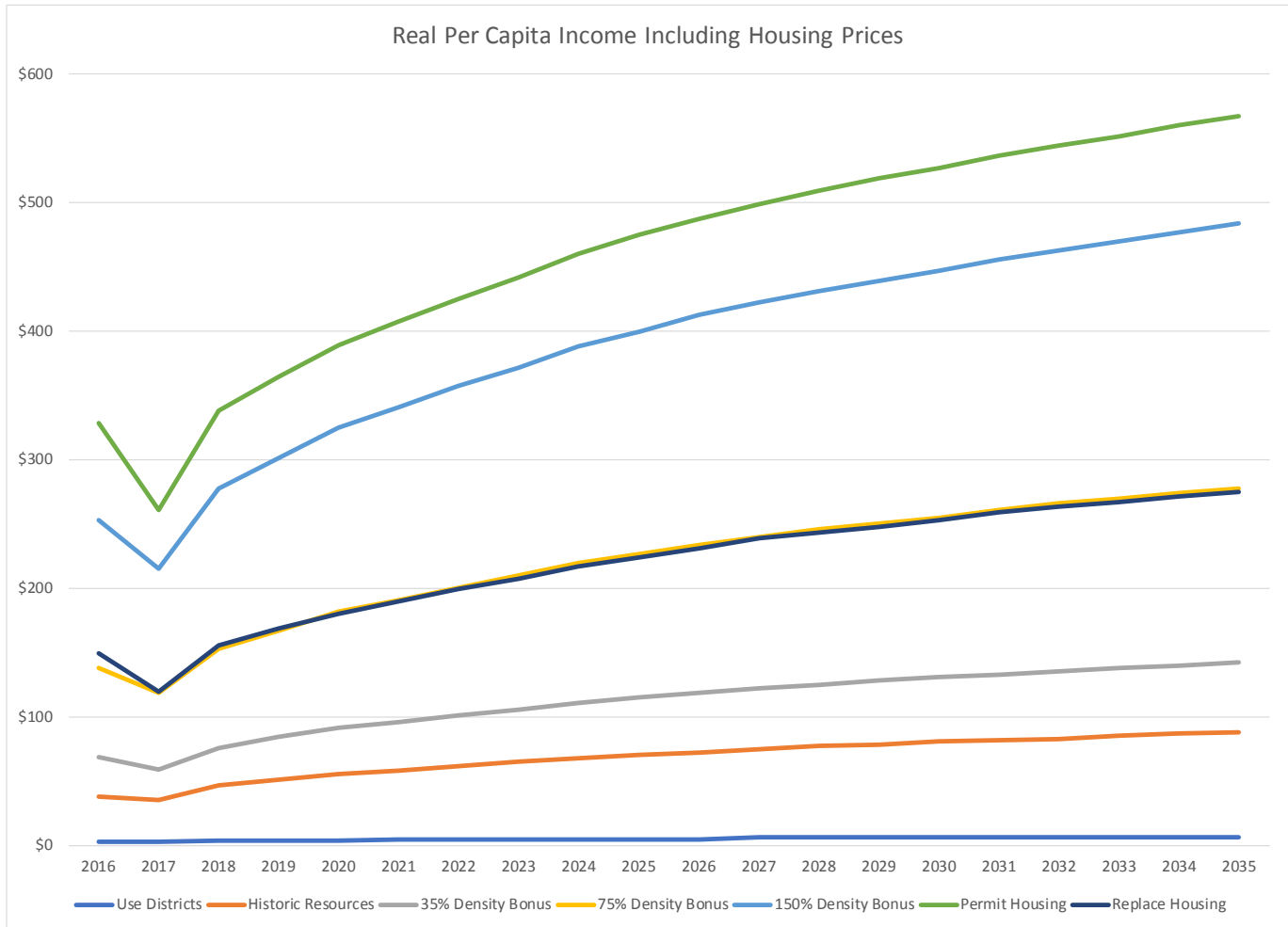
Impacts: Housing Production Over 20 Years, Vs. Baseline



Impacts: GDP, 20 Years vs. Baseline



Real Per Capita Income, Including Housing Prices: 20 Years vs. Baseline



Conclusions

- As a “first generation” model, there are many data and statistical limitations to this work, and caveats regarding the specific results are in order.
- However, a few things seem to be clear, and are unlikely to change with further refinements:
 - Zoning does limit housing production in San Francisco
 - Increasing housing production would lower housing prices
 - The economic benefits of increasing housing appear to greatly exceed the costs
- For us, the model represents a new and better way to estimate the impact of zoning changes, which are fairly common in San Francisco.