Capital Gains Taxation and House Price Growth: Evidence from the COVID-19 Era

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This study investigates whether real estate capital gains taxation contributed to moderating housing price increases during the COVID-19 era of monetary expansion. We use the sample of 29 out of the total OECD countries from 2012 to 2022 and estimate Generalized Method of Moments (GMM) models to examine the relationship between capital gains taxes and housing price dynamics. Findings suggest that although recent tax reforms and higher relative tax burdens on real estate were associated with lower housing price growth during the COVID-19 pandemic, the effects were conditional on liquidity conditions. We specifically find that as M1 expanded, the mitigating effect of capital gains taxes diminished and was generally offset in an environment with aggressive monetary expansion. This research contributes to the literature by identifying this conditional effectiveness, showing that capital gains taxation alone does not appear to offset liquidity-driven housing booms and may even amplify short-term volatility. Lastly, findings highlight the importance of fiscal–monetary coordination during future expansionary episodes.

Keywords: Capital gains taxation; Housing prices; Monetary expansion; Liquidity; COVID-19; OECD panel

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I. Introduction

Since the late 2000s, the global economy has faced several serious downturns, such as the 2008 Global Financial Crisis, the Eurozone sovereign debt crisis in 2011–2012, and the COVID-19 pandemic. Unlike the usual pattern, in which a recession is followed by a clear recovery, these events have left many advanced economies stuck in a low-growth phase for a while. This situation raised a question by economists and policymakers: Are these weak recoveries temporary outcomes of unusual events, such as pandemics or financial crises, or are they signs of structural problems resulting in a "new normal" of low growth? Although economists' opinions differ, many central banks have actively responded with a huge expansion of credit. After 2008, the US Federal Reserve (Fed) adopted zero interest rates and large-scale asset purchases (QE), which marked the beginning of a global trend. The European Central Bank (ECB) followed during the Eurozone debt crisis, and the Bank of Japan started unlimited government bond purchases after 2012. These mechanisms appeared to become standard tools across major economies. Although the Fed began to gradually raise interest rates and shrink its balance sheet in 2015, other countries did not immediately follow the US. Consequently, global credit continued to expand, especially outside the US. The COVID-19 shock in 2020 triggered another round of aggressive expansion, this time both fiscal and monetary. Governments and central banks maintained this stance through early 2022, before interest rates began to rise again in mid-2022, starting with the Fed's 50 basis point hike in May.

From 2010, most advanced countries experienced a rapid rise in money supply. In many cases, monetary aggregates grew faster than GDP did. One way to interpret this situation is that a large share of liquidity was not absorbed by the real economy and, instead, flowed into asset markets. For example, Japan's base money reached over 100% of GDP by 2020.

The situation—excess liquidity combined with weak real demand—led to sharp rises in asset prices. Real estate became a prime target asset for increased capital, possibly because physical constraints during the

Table 1.1
Year-end growth rate of the monetary base (%)

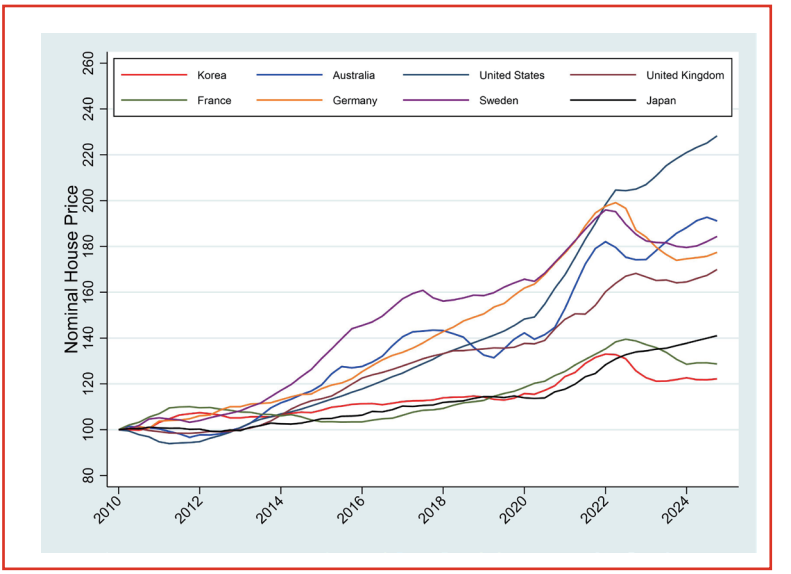
	2012	2014	2016	2018	2020	2021	2022
Australia	5.8	6.1	5.5	3.8	17.4	3.8	1.1
Austria	7.1	−1.0	12.1	12.1	94.4	11.5	−15.5
Denmark	90.2	−21.1	−15.4	−10.4	1.5	162.5	15.5
France	11.6	2.5	28.6	1.2	58.1	18.8	−4.7
Germany	24.3	−12.4	43.8	−1.2	54.0	16.0	0.8
Greece	−4.2	6.4	0.4	7.9	50.2	40.4	−6.5
Italy	4.2	0.5	28.1	−11.6	63.7	24.2	−21.9
Japan	11.8	38.2	23.1	4.8	18.3	8.5	−5.6
South Korea	10.4	12.0	9.1	10.6	15.5	12.3	10.9
Mexico	10.8	15.8	14.4	8.3	21.6	15.2	10.6
Netherlands	−7.3	−15.8	33.7	5.1	60.1	14.5	−2.1
New Zealand	8.9	6.7	7.7	6.4	12.2	7.1	1.8
Spain	16.1	−1.6	21.9	8.1	63.1	31.8	−20.9
UK	49.5	1.1	17.6	4.6	54.1	23.5	−3.4
US	0.2	−0.4	−4.4	−10.7	52.6	20.9	−15.7

*Source: Bloomberg

COVID-19 pandemic limited other spending options. Moreover, societal shifts, such as automation and AI, weakened the traditional monetary policy feedback of increased demand translating into additional employment and output. Consequently, many countries experienced rapid housing price appreciation, particularly in the early 2020s.

In general, when governments are faced with concerns about housing affordability and financial stability, they typically have several tools to respond: monetary tightening, tax rate increases, and housing supply expansion.[1] However, non-tax policy options faced severe limitations

[1] We acknowledge that macroprudential regulations, such as LTV/DTI limits and countercyclical capital buffers, are also critical policy tools. However, owing to the significant heterogeneity in the specific measures and implementation across the 29 OECD countries, they are challenging to incorporate robustly into a cross-country analysis. Furthermore, given that these regulations often aim to curb credit expansion and are typically influenced by the relatively broad



Note: Nominal house price data are derived from the OECD Housing Statistics database and re-indexed by the author to 2010 Q1 = 100.

FIGURE 1.1
HOUSING PRICE TRENDS BY SELECTED COUNTRIES, 2010–2025.

during the 2010s and the COVID-19 pandemic. Monetary tightening was often politically infeasible owing to relatively broad economic risks, and supply expansion was constrained by zoning rules and long lags. In this context, we focus on tax policy, specifically whether differences in capital gains taxation on real estate, relative to stock gains taxation, shaped how monetary expansion translated into housing price dynamics during the COVID-19 pandemic. Given prior findings that tax-based instruments may be less effective than expected, we explore whether the stabilizing role of capital gains taxation is weakened under conditions of aggressive monetary expansion.

Several studies examined the implications of capital gains taxes on markets. A frequent concern is the so-called lock-in effect, which refers to the tendency of asset owners to postpone sales when capital gains tax

monetary environment, controlling for monetary expansion variables in our model (as discussed in Section 2) implicitly accounts for a large portion of the macroeconomic context in which these policies operate.

rates are high, thereby reducing supply and exerting upward pressure on prices. In terms of financial investment, Feldstein et al. (1980) provided early empirical evidence for this type of behavior, showing that relatively high capital gains tax rates reduce realizations of capital gains. By contrast, Auten and Clotfelter (1982) showed that although realizations respond to taxes, the long-run (permanent) effect is smaller and not always statistically significant, relative to earlier estimates. Englund (1986) turned to the housing market, used an overlapping-generation model, and found that moderate increases in capital gains tax (starting from a low level) can reduce housing demand more than it reduces housing supply, thereby exerting downward pressure on prices. However, when the absolute tax level is already high, another increase may well discourage housing supply more than demand, driving prices upward. In addition, Aregger et al. (2011) analyzed Swiss cantonal data and concluded that considerably high capital gains taxes often intensified upward price trends owing to supply constraints driven by lock-in behavior.

Crowe et al. (2011) conducted a cross-country study and reviewed the policy tools utilized by OECD governments during the housing boom. These tools include monetary tightening, tax policy, and macroprudential regulation. Their analysis suggested that tax-based instruments may be less effective than theory would imply, often caused by behavioral responses, such as tax avoidance. In housing boom driven by general growth, monetary policy is likely to be effective, while in credit-fueled booms, financial regulations are considered the most valid tool.

We build on the prior findings and investigate how capital gains taxation on real estate interacted with liquidity expansion in shaping housing price dynamics during the credit expansion period. In particular, this study asks whether pre-existing tax regimes and pre-pandemic tax reforms affected the responsiveness of housing prices to liquidity expansion during the COVID-19 era. Note that changes in capital gains taxation may not immediately affect housing market behavior. Given the size and complexity of housing investments for a household, behavioral responses may be delayed particularly for existing homeowners owing to lock-in effects. However, potential buyers may gradually adjust their expectations and behavior in response to anticipated after-tax returns. Therefore, we consider tax reforms introduced in the 2010s—not just those during the 2020–2021

pandemic—because these earlier changes could have influenced housing markets during the COVID-19 era monetary expansion. Moreover, we examine whether countries with higher capital gains taxes on real estate than on stock investment experienced lower housing price increases during the COVID-19 era.

First, we analyze the tax reform history of OECD countries to identify those that raised real estate capital gains taxes in the 2010s and those that had a relatively higher real estate capital gains tax rate than financial capital gains tax rate. Even though we consider tax rates (or differential) as main variables in a continuous treatment setting, these countries may conceptually be considered the treated group, while countries that did not significantly change their tax rates, or those that did not have relatively higher real estate capital gains tax rates, may be considered the control group. Second, we analyze housing price dynamics in relation to tax variables during the COVID-19 monetary expansion, when liquidity surged across the countries.

We find two main results. First, real estate capital gains taxation is associated with relatively slow housing price growth during the COVID-19 pandemic but only when monetary policy is not overly expansionary. However, the dampening effect of capital gains taxation in highly expansionary monetary environments appears to disappear, suggesting that coordinated macro-financial policy would be needed to stabilize housing prices. Second, our results also indicate that tax effects were observed primarily in countries that raised their capital gains tax on real estate prior to the COVID-19 pandemic, or in those with a relatively higher capital gains tax rates on real estate compared with financial assets. By contrast, countries with persistently high levels of real estate capital gains taxes, but without recent reform, did not show significant tax effects. We interpret these findings as follows: countries that increased capital gains taxation on real estate may have done so in response to housing market pressures. Given that changing tax laws is often politically and institutionally difficult, such reforms likely reflect the government's clear policy direction. By contrast, countries with structurally high capital gains taxes may simply reflect traditional fiscal norms, rather than active attempts to influence recent market conditions. This distinction could explain why we find significant effects for tax changes and relative tax burdens, but not for tax levels themselves.

Poghosyan (2016) examined how real estate taxes can reduce housing

price volatility in US metropolitan areas. The current study builds on this literature by focusing specifically on real estate capital gains tax reforms in an international context. Although Poghosyan (2016) provided evidence that property taxes can stabilize housing markets, our results suggest that the timing and relative structure of capital gains tax changes can also play a crucial role. Both studies emphasize that carefully designed tax policies may help stabilize housing market dynamics, albeit through different policy instruments.

This research contributes by showing that the effectiveness of real estate capital gains taxation is conditional on the prevailing macro-financial environment. Although prior studies have often assessed whether tax instruments stabilize housing markets, our results indicate that their impact depends on liquidity regime. In moderately expansionary environments, higher real estate capital gains taxation is associated with weaker housing price responses. However, under aggressive liquidity expansion, this relationship becomes substantially weakened. In this sense, tax effectiveness is state-dependent rather than uniform across monetary conditions.

The remainder of this paper is organized as follows. Section 2 provides our empirical framework to analyze capital gains taxation and its potential effects on housing markets. Section 3 describes the data and presents summary statistics. Section 4 discusses the estimation results. Lastly, Section 5 provides the conclusions.

II. Empirical Framework

We compare the capital gains treatment of real estate across major economies since 2012 and assess their relationship with housing price changes. The empirical analysis focuses on the period from 2012 to 2022, which begins after the initial recovery from the global financial crisis and ends as the monetary expansion following the COVID-19 pandemic began to reverse. This decade broadly coincides with a period of globally accommodative monetary conditions.

Returns on investment in capital markets and real estate markets include dividends, rents, and capital gains. Real estate transactions are typically subject to various forms of taxation, such as property taxes, transaction or stamp duties, income taxes on rental earnings, and capital gains taxes. Given our focus on asset price dynamics, this study primarily concentrates on capital gains tax. During periods of sharp

asset price appreciation, the majority of investment returns are likely to come from capital gains, rather than dividends or rents. This implies that capital gains tax rates for real estate and equities can potentially affect the relative after-tax return of each asset class more significantly than taxes on dividends or rents.

In addition, imposing heavier taxation on capital gains from real estate, compared with those from stocks or other financial assets, would shift investor demand away from housing and toward capital market instruments. Given that tax systems differentiating capital gains across asset classes are implemented in many countries, it becomes important to empirically investigate their relative effects.

Therefore, within the aforementioned time frame, we identify three types of variation by compiling capital gains tax rate data for the sample countries: (1) changes in real estate capital gains tax rates over the period 2012–2020, (2) capital gains tax rate differentials between real estate and stocks as of 2020, and (3) absolute levels of real estate capital gains tax rates as of 2020. The three variables capture distinct dimensions of capital gains taxation. The first reflects recent policy changes in real estate gains taxation.[2] The second captures the relative tax burden between real estate and stock. Lastly, the third represents the structural level of real estate capital gains taxation.

Note that our empirical analysis does not attempt to identify short-run, contemporaneous tax effects during the COVID-19 pandemic. Housing investment decisions are often long-horizon and subject to substantial transaction costs. Behavioral responses to capital gains taxation, particularly in the presence of lock-in effects, are unlikely to appear immediately. Instead, tax structures shape expectations and portfolio allocation incentives over time. Therefore, our empirical strategy focuses on how different institutional tax structures, formed prior to the COVID-19 pandemic, interacted with housing price

[2] Given that housing investments are typically large and infrequent, behavioral responses in housing markets may be revealed over extended time. For example, increased capital gains taxation may discourage sales in the short run owing to lock-in effects, while gradually influencing expectations and investment strategies among prospective buyers. Therefore, we construct a policy change variable that measures the size of capital gains tax rate changes introduced in the preceding decade. This approach enables us to substantially reflect the gradual and often delayed behavioral responses in housing markets.

responses to a strong liquidity shock.[3]

The main empirical strategy is to assess whether countries with higher real estate capital gains tax rates exhibited different relationships between monetary expansion and housing price changes—especially during the COVID-19 period—relative to countries with lower tax rates. This aspect enables us to examine whether capital gains taxation moderates the impact of liquidity expansion on housing price dynamics. A dynamic panel model is utilized to estimate these effects, thereby enabling lagged price dynamics via difference-GMM estimation. The model is specified as follows:[4]

$$\begin{aligned} \mathrm{HPI}_{it} = {} & \alpha \mathrm{HPI}_{it\text{-}1} + \beta_1 \cdot \mathrm{M1}_{it} + \beta_2 \cdot \mathrm{InterestRates}_{it} + \beta_3 \cdot \mathrm{GDP}_{it} + \beta_4 \cdot \mathrm{CPI}_{it} \\ & + \beta_5 \cdot \mathrm{Covid\text{-}era}_t + \beta_6 \cdot \mathrm{M1}_{it} \times \mathrm{Covid\text{-}era}_t + \beta_7 \cdot \mathrm{GDP}_{it} \times \mathrm{TaxVar}_i \\ & + \beta_8 \cdot \mathrm{Covid\text{-}era}_t \times \mathrm{TaxVar}_i + \beta_9 \cdot \mathrm{M1}_{it} \times \mathrm{TaxVar}_i \\ & + \beta_{10} \cdot \mathrm{M1}_{it} \times \mathrm{Covid\text{-}era}_t \times \mathrm{TaxVar}_i + \mu_i + \varepsilon_{it}, \end{aligned} \tag{1}$$

where HPI_{it} is (log) nominal house price index for country i at time t, $\mathrm{M1}_{it}$ is (log) M1 index, $\mathrm{InterestRates}_{it}$ is long-run interest rates, GDP_{it} is (log) GDP per capita, CPI_{it} is (log) CPI index, $\mathrm{Covid\text{-}era}_t$ is an indicator for the COVID-19 pandemic (i.e., 2020–2022), and TaxVar_i is the three tax variables explained above. Note that the Covid-era dummy captures common non-monetary shocks associated with the COVID-19 pandemic that are not fully reflected in liquidity measures. These shocks include lockdown-related mobility restrictions, shifts toward remote work, changes in consumption patterns, housing preference adjustments (e.g., demand for relatively large living spaces), and heightened policy uncertainty. Although monetary expansion is explicitly controlled through M1, the Covid-era dummy accounts for relatively broad pandemic-related factors that may have affected housing markets through channels other than liquidity.

[3] Moreover, only a few OECD countries implemented significant capital gains tax reforms in 2020–2022 (see Appendix Table A1), implying that the relevant variation during the COVID-19 pandemic primarily reflects pre-existing tax structures rather than contemporaneous policy shifts.

[4] Although the equation is presented in levels for clarity, we estimate it using difference-GMM. First-differencing removes country fixed effects, and, following Arellano–Bond, lagged levels (from t-2 backward) of endogenous/predetermined regressors serve as instruments for the differenced equation. These aspects are valid under the absence of second-order serial correlation (confirmed by AR(2)).

The main variables of interest in this study are the two interaction terms, Covid-era$_t$×TaxVar$_i$ and M1it×Covid-era$_t$×TaxVar$_i$, where the first term captures how pre-existing tax structures are associated with housing price dynamics during the COVID-19 monetary expansion period, and the second term captures how the association between monetary supply and housing prices varies across different tax structures during the pandemic period.

For estimation, we adopt difference-GMM as the baseline and report system-GMM as a robustness check for interaction-rich specifications. The difference-GMM estimator (Arellano–Bond) is used as our baseline because with a relatively short time dimension and highly persistent housing prices, differencing removes country fixed effects without putting additional restrictions required by system-GMM. In addition, baseline difference-GMM diagnostics are reliable and clean, as reported in the estimation tables.

Note that our empirical model reflects the demand side of housing markets. Although supply-side factors, such as zoning and construction constraints, also matter for housing prices, they are considerably difficult to control for in a cross-country panel. For example, Poghosyan (2016) used two housing supply indicators: share of undevelopable land area (see Saiz, 2010) and Wharton's property regulation index (see Gyourko et al., 2008). These measures are suitable for a single-country analysis, at least in the US, but are difficult to apply in an international study owing to differing conditions across countries. However, assuming that supply-side conditions did not substantially change within countries during this relatively short period, our model accounts for unobserved supply-side heterogeneity by including country fixed effects, thereby mitigating omitted variable bias related to housing supply. To the extent that residual supply-side shocks are not systematically correlated with tax structures and liquidity expansion across countries, the estimated relationships remain informative about the interaction between taxation and liquidity conditions.

III. Data

We construct a panel dataset covering 29 OECD member countries, which are selected based on data availability for housing prices, monetary aggregates, tax policy variables, and other macroeconomic control variables from 2012 to 2022 with quarterly frequency. The

dependent variable is nominal house price index (base year normalized to 100) compiled from the OECD Housing Statistics, and expressed in log form. One of the key explanatory variables is the M1 monetary aggregate index, also expressed in log form, which captures narrow money (typically currency in circulation and demand deposits). M1 is chosen because it directly captures the stock of highly liquid assets available for immediate spending and is closely associated with liquidity available for immediate transactions and, therefore, directly related to investment dynamics, including real estate investment. Furthermore, M1 is considered a closer measure for the quantitative easing (QE) effects that dominated the global monetary environment during our sample period. Unlike other aggregates, such as monetary base (MB) or M2, M1 data are also more consistently available and comparable across OECD countries over the full sample period.[5]

To ensure cross-country comparability over 2012–2020 and to capture the effective tax burden on real-estate investment, we construct a top-bracket effective capital-gains rate accounting for key tax law variations across countries. This effective tax rate starts with statutory maximums and incorporates a common taxpayer scenario. In particular, we assume a three-year holding period and a 50:50 split between owner-occupied and investment properties (single-homeowners vs. multi-homeowners/investors) whenever needed. For systems with differentiated schedules (e.g., South Korea, Czech Republic, Italy), we incorporate major reliefs (e.g., long-term holding allowances) and surcharges (e.g., multi-property penalties) and apply the 50:50 ownership weight. In unified personal income tax systems (e.g., Australia, Canada), the top marginal rate is adjusted downward by the standard statutory deduction or inclusion rate applied to capital gains. Lastly, in separate flat-rate regimes (e.g., Austria, Ireland, Norway), we use the published flat capital gains tax rate. Appendix Table A1 reports the country-year effective rates over the

[5] We acknowledge that broader aggregates, such as M2 or credit-based measures, may, in some contexts, be more closely associated with housing market dynamics. However, consistent cross-country definitions of broader aggregates and credit variables are more limited over our sample period, especially in quarterly frequency. In addition, for euro-area countries operating under a common monetary policy, national monetary aggregates (e.g., M1 or M2) should be interpreted with caution. Therefore, our empirical focus is on relative cross-country liquidity conditions rather than country-specific monetary policy autonomy.

Table 3.1
Summary Statistics here.

Variables	Mean	Std. Dev.	Min	Max
Nominal house price index (log)	4.758	0.253	4.274	5.770
Real estate capital gains tax (level)	0.244	0.107	0.000	0.422
Real estate capital gains tax changes	0.011	0.034	–0.060	0.132
Capital Gains Tax Rates differential	0.007	0.103	–0.162	0.250
GDP (log)	10.712	0.383	9.664	11.890
CPI (first-differenced log)	0.006	0.010	–0.021	0.079
M1 index (log)	4.767	0.405	3.891	6.528
Long-term interest rate (%)	2.551	2.455	–0.614	25.400

sample window.

We also include long-term interest rates as a control variable to capture general borrowing conditions in the housing market. We choose long-term rates over short-term rates because the latter hit the zero lower bound (ZLB) during much of the sample period, rendering them ineffective as a measure of the cost of long-term credit. Given that housing investments are long-horizon decisions, the general borrowing condition is better proxied by long-term interest rates. Other control variables include the log of GDP per capita and the log difference of CPI, which captures inflation and satisfies stationarity.

The final dataset covers 29 countries over 11 years. Country dummies are implicitly controlled for by first-differencing within the GMM framework. Table 3.1 provides the summary statistics for the key variables used in the analysis.

IV. Empirical Results

A. Baseline Results

Our baseline model examines how changes in real estate capital gains taxes in the 2012–2020 period are correlated with housing prices in the 2020–2022 period (i.e., COVID-19 pandemic). The main tax variable of interest in this baseline specification is changes in real estate capital gains tax rates, with which we intend to capture the extent to which each government raised its real estate capital gains tax rate in the top

bracket between 2012 and 2020. For example, a higher value of the tax variable in this specification indicates a greater increase in real estate capital gains tax burden during the pre-pandemic years.

The dependent variable is the nominal housing price index, while the lagged dependent variable is included to control for any persistence shown in housing prices in this dynamic panel model. We also account for demand-side macro factors, such as GDP (log), inflation (first-differenced log), and M1 aggregates. A long-term interest rate variable is also included to capture general borrowing conditions in the housing market.

Column (1) of Table 4.1. runs the simplified regression without the tax variable. As expected, the coefficient of the lagged dependent variable is 0.8250 and statistically significant at 1%, implying strong persistence in housing prices — a result consistent with housing market inertia. The monetary aggregate (M1), of which the coefficient is estimated at 0.0376, has a positive and significant effect on housing prices, suggesting that a 10% money supply expansion leads to housing price increases by 0.38%. Other control variables are estimated generally as expected. Interest rates are significantly negative, indicating housing price increases when potential home buyers have relatively easy access to credit. Real GDP and inflation also have positive and statistically significant effects, consistent with a demand-driven housing price mechanism. Interestingly, the Covid-era dummy and interaction term with M1 index are small and statistically insignificant. On average, housing price increases during the COVID-19 period were not uniquely driven by pandemic-specific factors but are generally explained by monetary expansion and other macroeconomic conditions.

In Column (2), we estimate the baseline regression with the tax variable. The validity of the instruments is supported by the Hansen J test, which does not reject the null hypothesis of instrument exogeneity (p-value = 0.543). In addition, the Arellano–Bond test for second-order serial correlation (AR(2)) yields a statistically insignificant result (p-value = 0.388), indicating that the moment conditions and model specification are appropriate. The coefficients of the variables estimated in Column (2) are qualitatively and quantitatively similar to those in Column (1). The coefficient of one of the main variables, the interaction between the Covid-era and tax variable, which reflects how pre-existing real estate capital gains tax structures are associated with housing price dynamics during the pandemic period, is estimated at −1.1074 and

Table 4.1

Baseline estimation results

Dependent Variable: Housing Price Indices		
Variables	(1)	(2)
Housing Price Indices (−1)	0.8250*** (0.0465)	0.8134*** (0.0471)
M1	0.0376** (0.0171)	0.0448** (0.0188)
Long-term Interest Rates	−0.0016* (0.0010)	−0.0015 (0.0010)
GDP	0.0938*** (0.0303)	0.0845*** (0.0294)
CPI Index	0.1272*** (0.0378)	0.1242*** (0.0368)
Covid-era dummy	0.0362 (0.1036)	0.1239 (0.0864)
M1 × Covid-era	−0.0061 (0.0207)	−0.0238 (0.0173)
GDP × tax_variable		0.4089 (0.2607)
Covid-era × tax_variable		−1.1074* (0.6448)
M1 × tax_variable		0.1051 (0.1523)
M1 × Covid-era × tax_variable		0.2174* (0.1255)
Hansen J	1.45 [0.484]	0.37 [0.543]
AR (1)	−2.09** [0.037]	−2.08 [0.038]
AR (2)	0.73 [0.463]	0.86 [0.388]
Number of observations	1221	1221
Number of groups	29	29

Notes: (1) The table presents results from dynamic panel regressions estimated using difference GMM.

(2) Tax variable is the change in real estate capital gains tax rates.

(3) Robust standard errors are in parentheses; square brackets indicate p-values.

(4) All models include country fixed effects through differencing.

(5) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

statistically significant. This result suggests that the country that raised its real estate capital gains tax rates by 10%p (i.e., tax variable = 0.1) is associated with a relatively low housing price response during the COVID-19 pandemic by 11.074%.

Crucially, the triple interaction term among M1, Covid-era, and tax variable is positive (0.2174) and also significant at the 10% level. This finding indicates that during the COVID-19 period, monetary expansion is more closely correlated with housing prices in countries with higher real estate capital gains tax rates. Given that the log level of M1 across our OECD sample generally ranges between 4.5 and 5.5, with an average of approximately 5, suppose a country had implemented tax reforms raising the real estate capital gains tax rate by 10%p. Then, first, the baseline Covid-era × tax variable interaction term of −1.1074 implies an 11.074% reduction in housing price growth during the period. However, the triple interaction term (M1 × Covid-era × tax variable = 0.2174) demonstrates that in economies with M1 (log) around 5, the tax effect is nearly neutralized, thereby offsetting the baseline level effect (−11%) with the liquidity effect (+11%).

The preceding result implies that once the triple interaction is considered, the marginal relationship between taxation and housing prices during the COVID-19 pandemic is conditional on the level of liquidity (M1). In economies with high liquidity conditions, the conditioning effect of taxation becomes substantially weakened.

B. Alternative Estimation 1: Using Tax Differential as Tax Variable

We re-estimate the dynamic panel model using an alternative measure of taxation: the differential between real estate and financial asset capital gains tax rates. The tax variable of interest in this estimation measures the differences in top-bracket capital gains tax rates between real estate and financial investments as of 2020. That is, a higher value of the tax variable indicates that real estate capital gains are taxed more heavily than are capital gains from financial assets, potentially shifting investment behavior and influencing housing market.

We apply the same dynamic panel specification and difference GMM estimation strategy used in the previous baseline analysis. The dependent variable is the nominal housing price index, and the lagged dependent variable continues to account for price inertia. Control

variables include the log GDP, first-differenced log CPI, M1 monetary aggregates, and long-term interest rates to reflect borrowing conditions.

In Table 4.2, and later in Table 4.3, column (1) repeats the baseline from Table 4.1 (without tax variables) to provide a stable benchmark for column (2), which introduces the tax variable(s). As shown in Table 4.2, the results are qualitatively consistent with the baseline: the coefficient of the lagged dependent variable remains large and statistically significant. Similarly, the monetary aggregate (log M1) retains a positive and statistically significant relationship with housing prices, suggesting that monetary expansion tends to boost asset prices.

The main variable of interest in this model is the interaction term between the Covid-era and tax variable, which now reflects the degree of the tax differentials during the COVID-19 period. The coefficient of this variable (−1.2769) is again negative and statistically significant at the 5% level. This finding confirms the interpretation that greater tax burdens on real estate, now relative to financial assets, is associated with a weaker housing price response during the COVID-19 period under moderate liquidity conditions. Moreover, the triple interaction term among M1, Covid-era, and tax variable is also positive and significant, similar to the baseline model. This finding suggests that, despite the overall negative effect of higher real estate tax burdens, the marginal impact of monetary expansion on housing prices may have been stronger in countries with larger tax differentials. This result is consistent with the previous interpretation that although tax policy may affect the level of price response, it may not fully counteract the impact of monetary shocks into asset markets.

Control variables again behave as expected. Higher long-term interest rates are associated with lower housing price growth, consistent with tighter credit conditions. GDP growth and inflation contribute positively and significantly to housing price increases, indicating that macroeconomic fundamentals play an important role in price formation.

Overall, the results support the robustness of our previous main findings. The alternative construction of the tax variables does not substantially alter the main conclusion: capital gains taxation on real estate does not appear to offset strong monetary expansion when liquidity conditions are highly expansionary.

TABLE 4.2
FIRST ALTERNATIVE ESTIMATION RESULTS

Dependent Variable: Log Housing Price Indices		
Variables	(1)	(2)
Housing Price Indices (-1)	0.8250*** (0.0465)	0.7901*** (0.0519)
M1	0.0376** (0.0171)	0.0590*** (0.0221)
Long-term Interest Rates	−0.0016* (0.0010)	−0.0012 (0.0009)
GDP	0.0938*** (0.0303)	0.0902*** (0.0307)
CPI Index	0.1272*** (0.0378)	0.1210*** (0.0351)
Covid-era dummy	0.0362 (0.1036)	−0.0325 (0.0576)
M1 × Covid-era	−0.0061 (0.0207)	0.0074 (0.0115)
GDP × tax_variable		−0.1603 (0.2440)
Covid-era × tax_variable		−1.2769** (0.6401)
M1 × tax_variable		0.0816 (0.1135)
M1 × Covid-era × tax_variable		0.2564** (0.1287)
Hansen J	1.45 [0.484]	0.00 [0.999]
AR (1)	−2.09** [0.037]	−2.05** [0.040]
AR (2)	0.73 [0.463]	0.81 [0.417]
Number of observations	1221	1221
Number of groups	29	29

Notes: (1) The table presents results from dynamic panel regressions estimated using difference GMM.
(2) Tax variable is the tax differential between real estate and stock capital gains tax rates.
(3) Column (1) is repeated from Table 4.1 (baseline without tax variables) for comparison purposes.
(4) Robust standard errors are in parentheses, and square brackets indicate p-values.
(5) All models include country fixed effects through differencing.
(6) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C. Alternative Estimation 2: Using Real Estate Capital Gains Tax Level as Tax Variable

We again estimate the empirical model using a third tax variable to test whether the level of real estate capital gains tax rates in 2020—rather than changes or differentials—was correlated with housing price increase during the COVID-19 period. In particular, the main tax variable of interest is the level of capital gains tax rates on real estate as of 2020. Moreover, the interaction term between this variable and the Covid-era dummy is included to capture whether countries with consistently high real estate tax rates saw relatively mitigated housing price growth during this period.

We estimate a dynamic panel model, and column (2) of Table 4.3 presents the results. The coefficient of the lagged dependent variable is 0.8164 and statistically significant at the 1% level, and other macroeconomic control variables exhibit similar results with the previous estimation.

However, turning to the tax variables, the coefficient of the interaction term between the Covid-era and tax variable, which measures the interaction between high capital gains tax rates and the COVID-19 pandemic, is now positive (statistically insignificant). Similarly, the triple interaction term among M1, Covid-era, and tax variable, now negative, is also insignificant. Therefore, this analysis suggests that simply having a high real estate capital gains tax rate as of 2020 is not significantly associated with differential housing price growth during the COVID-19 period.

Unlike the findings in Tables 4.1 and 4.2, in which tax reforms or relative burdens showed significant effects, countries with persistently high tax levels in 2020 did not appear to experience comparable patterns in housing price moderation. These results may be interpreted considering the government's underlying policy purpose. Countries that increased capital gains taxation on real estate likely did so in response to rising housing market pressures. Given that tax reforms are often politically and institutionally challenging, such changes typically signal a deliberate policy shift. By contrast, countries with persistently high capital gains tax rates may merely reflect traditional fiscal conventions. Hence, we find no clear evidence that the level of capital gains taxation has played a stabilizing role in recent housing market dynamics. We believe this distinction explains why tax changes and relative tax

TABLE 4.3
SECOND ALTERNATIVE ESTIMATION RESULTS

Dependent Variable: Log Housing Price Indices		
Variables	(1)	(2)
Housing Price Indices (−1)	0.8250*** (0.0465)	0.8164*** (0.0476)
M1	0.0376** (0.0171)	0.0106 (0.0335)
Long-term Interest Rates	−0.0016* (0.0010)	−0.0015 (0.0010)
GDP	0.0938*** (0.0303)	0.1609** (0.0741)
CPI Index	0.1272*** (0.0378)	0.1264*** (0.0353)
Covid-era dummy	0.0362 (0.1036)	0.0455 (0.1492)
M1 × Covid-era	−0.0061 (0.0207)	−0.0070 (0.0297)
GDP × tax_variable		−0.2916 (0.2170)
Covid-era × tax_variable		0.3893 (0.7903)
M1 × tax_variable		0.1693 (0.1205)
M1 × Covid-era × tax_variable		−0.0826 (0.1592)
Hansen J	1.45 [0.484]	0.33 [0.567]
AR (1)	−2.09** [0.037]	−2.08** [0.037]
AR (2)	0.73 [0.463]	0.75 [0.455]
Number of observations	1221	1221
Number of groups	29	29

Notes: (1) The table presents results from dynamic panel regressions estimated using difference GMM.
(2) Tax variable is the absolute level of real estate capital gains tax rates.
(3) Column (1) is repeated from Table 4.1 (baseline without tax variables) for comparison purposes.
(4) Robust standard errors are in parentheses, and square brackets indicate p-values.
(5) All models include country fixed effects through differencing.
(6) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

burdens have been estimated as stronger effects on housing prices than static tax levels.

D. Robustness: System-GMM

We check robustness using a two-step system-GMM estimator for the main specifications reported in Tables 4.1 and 4.2 (column 2). This estimator complements the baseline difference-GMM by exploiting additional moment conditions in levels. We use collapsed instrument sets and short lag lengths (2 to 3) to mitigate instrument proliferation. Consequently, diagnostics are generally satisfactory: the AR(2) test fails to reject the null of no second-order serial correlation and Hansen tests p-values are within appropriate ranges. Moreover, the key interaction terms consistently show their signs and significance across tax definitions, real estate capital gains tax rate changes, and capital gains tax rates differentials. In particular, the interaction term between Covid-era × tax variable remains negative and significant, and the triple interaction term, M1 × Covid-era × tax variable, remains positive and significant. This result strongly confirms the main finding that liquidity expansion partially offsets the conditioning role of capital gains taxation.

V. Conclusion

This study examines whether capital gains taxation on real estate was associated with differential housing price responses during the COVID-19 pandemic period. Using a dynamic panel framework, we find that countries that implemented real estate capital gains tax increases between 2012 and 2020 experienced slower housing price growth during the COVID-19 pandemic. This result suggests that tax reforms, particularly those enacted prior to the monetary shock, were associated with differential housing price responses during the COVID-19 period. Similarly, countries with higher real estate tax rates relative to stock investment taxes also show evidence of reduced housing price growth, suggesting the importance of tax differentials across asset classes in shaping investors' incentives. By contrast, the level of real estate capital gains tax rates, not accompanied by recent policy reforms, does not appear to have a statistically discernible effect on housing price during the same period. Thus, these findings suggest that the existence of

TABLE 4.4
ROBUSTNESS CHECKS

Dependent Variable: Log Housing Price Indices		
Tax Variables	Tax rate changes	Tax rate differentials
Housing Price Indices (-1)	1.0966***	1.0392***
	(0.0202)	(0.0353)
M1	−0.0194	−0.0079
	(0.0163)	(0.0262)
Long-term Interest Rates	−0.0032***	−0.0080**
	(0.0012)	(0.0033)
GDP	−0.0036	0.0178
	(0.0049)	(0.0145)
CPI Index	−0.0192	0.0877
	(0.0709)	(0.1359)
Covid-era dummy	−0.1994**	−0.3395**
	(0.0905)	(0.1402)
M1 × Covid-era	0.0354*	0.0630**
	(0.0184)	(0.0278)
GDP × tax_variable	0.0984	−0.0331
	(0.0999)	(0.0305)
Covid-era × tax_variable	−1.9365*	−1.2047*
	(1.0703)	(0.6937)
M1 × tax_variable	−0.2214	0.0698
	(0.2302)	(0.0720)
M1 × Covid-era × tax_variable	0.3903*	0.2260*
	(0.2199)	(0.1332)
Hansen J	25.25	22.84
	[0.118]	[0.197]
AR (1)	−2.12**	−2.11**
	[0.034]	[0.035]
AR (2)	0.82	0.36
	[0.412]	[0.719]
Number of observations	1225	1225
Number of groups	29	29

Notes: (1) The table presents results from dynamic panel regressions estimated using two-step system GMM.
(2) Two-step robust standard errors (Windmeijer-corrected) in parentheses, and square brackets indicate p-values.
(3) All models include country fixed effects through differencing.
(4) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

capital gains taxation and also the timing and relative structure of the tax may shape its conditioning role in influencing asset prices.

We find that the mitigating effect of capital gains taxation is conditional on the macro-financial environment. In particular, in countries that engaged in aggressive monetary expansion (proxied by M1 growth), the dampening effect of the tax policy was significantly weakened, and on average, nearly offset by liquidity. These findings imply that capital gains taxation alone does not appear to offset housing price pressures under expansive monetary conditions. Therefore, coordinated policy responses, involving fiscal and monetary instruments, are essential for stabilizing asset markets during periods of global monetary expansion.

Meanwhile, some caution is needed when interpreting our results. First, given the macro-level nature of our data, causal interpretations should be made with caution. Other factors, such as recent development of housing supply, or other related policies happening simultaneously, may have affected the results. Second, our analysis looks at national averages, so it may be unable to fully reflect differences across regions within each country. If liquidity-driven housing price dynamics are disproportionately concentrated in major metropolitan areas, then national-level price indices may obscure within-country heterogeneity. Our estimates should be interpreted as reflecting average national effects rather than local metropolitan dynamics.

Overall, this study contributes to the growing literature on the intersection of housing taxation and monetary policy by showing that fiscal tools remain relevant but limited in scope when liquidity conditions are exceptionally loose. Accordingly, strengthening the coordination between tax design and monetary stance may be critical to enhancing macro-financial stability in future expansionary cycles.

Consistent with this perspective, future research could further explore how capital gains taxation interacts with other housing-related policies, such as macroprudential credit regulations or land-use planning, to provide profound insights into how policy mixes affect housing market dynamics under varying monetary conditions.

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Appendix Table A1

Real Estate Capital Gains Tax Rates (Top Bracket)

	2012	2014	2016	2018	2020	2022
AUS	23.30%	23.30%	24.50%	23.50%	23.50%	23.50%
AUT	23.30%	25.00%	30.00%	30.00%	30.00%	30.00%
BEL	16.50%	16.50%	21.50%	21.50%	21.50%	21.50%
CAN	24.00%	24.80%	26.80%	26.80%	26.80%	26.80%
DNK	42.00%	42.00%	42.00%	42.00%	42.00%	42.00%
EST	21.00%	21.00%	20.00%	20.00%	20.00%	20.00%
FIN	32.00%	32.00%	34.00%	34.00%	34.00%	34.00%
FRA	40.50%	40.50%	40.50%	42.20%	42.20%	42.20%
DEU	26.40%	26.40%	26.40%	26.40%	26.40%	26.40%
GRE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
HUN	16.00%	16.00%	15.00%	15.00%	15.00%	15.00%
IRL	30.00%	33.00%	33.00%	33.00%	33.00%	33.00%
ISL	10.00%	10.00%	10.00%	11.00%	11.00%	11.00%
ISR	0.00%	25.00%	25.00%	25.00%	25.00%	25.00%
ITA	10.00%	10.00%	10.00%	10.00%	10.00%	13.00%
JPN	39.60%	39.60%	39.60%	39.60%	39.60%	39.60%
KOR	32.30%	32.30%	32.30%	42.00%	42.00%	48.50%
LTU	7.50%	7.50%	7.50%	7.50%	10.00%	10.00%
LAT	15.00%	15.00%	15.00%	20.00%	20.00%	20.00%
LUX	20.70%	21.80%	21.80%	22.90%	22.90%	22.90%
MEX	30.00%	35.00%	35.00%	35.00%	35.00%	35.00%
NLD	30.00%	30.00%	30.00%	31.00%	31.00%	31.00%
NZL	0.00%	0.00%	0.00%	13.20%	13.20%	15.60%
NOR	28.00%	28.00%	25.00%	23.00%	22.00%	22.00%
POL	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%
PRT	21.80%	25.20%	25.20%	23.60%	23.60%	23.60%
SVK	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%
SVN	25.00%	25.00%	25.00%	25.00%	27.50%	25.00%
ESP	27.00%	27.00%	23.00%	23.00%	26.00%	26.00%
SWE	22.00%	22.00%	22.00%	22.00%	22.00%	22.00%
CHE	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
GBR	28.00%	28.00%	28.00%	28.00%	28.00%	28.00%
USA	15.00%	23.80%	23.80%	23.80%	23.80%	23.80%

*Sources: OECD tax foundation, PwC worldwide tax summary, EY worldwide personal tax and immigration guide