

The Effects of Taxes, Inflation and Government Effectiveness on House Real Price in OECD Countries: A Panel Data Study

Maryam Yousefinejad

Senior Lecturer, Faculty of business management and professional studies, Management and Science University, Shah Alam, Malaysia
Email: maryam_youssefinejad@yahoo.com

Jaizah Othman, Aza Azlina Kassim

Associate Professor, Faculty of business management and professional studies, Management and Science University, Shah Alam, Malaysia
Email: jaizah_othman@msu.edu.my, aza_azlina@msu.edu.my

Aimi Anuar

Senior Lecturer, Faculty of business management and professional studies, Management and Science University, Shah Alam, Malaysia
Email: aimi_anuar@msu.edu.my

Farah AbdulAziz

PhD Student, Faculty of Accountancy, Universiti Teknologi MARA, Shah Alam, Malaysia
Email: farah_173@yahoo.com.my

Noorasiah Sulaiman

Associate Professor, Centre for Sustainable and Inclusive Development, Faculty of Economics and Management, the National University of Malaysia, Bangi, Malaysia
Email: rasiachs@ukm.edu.my

To Link this Article: <http://dx.doi.org/10.6007/IJAREMS/v11-i2/13031> DOI:10.6007/IJAREMS/v11-i2/13031

Published Online: 19 April 2022

Abstract

This study aims to investigate the relationship between income tax (TPI), goods and services tax (TGS) and property tax (TOP) on real house price (HRP). On the other hand, this study examines the impact of inflation and government effectiveness (GE) on HRP. As far as I know, there are few studies in the literature that have examined these relationships. There is also no study that has examined the relationship between inflation and GE as economic variables on HRP. This study is quantitative, and the research design used is panel data. This study collects data from the OECD database for 49 OECD countries from 2000 to 2019. Two

estimation methods, namely Ordinary Least Square (OLS) and LSDVC, are used in this study to minimize measurement error and test five hypotheses. Since LSDVC is more suitable to solve dynamic association, endogeneity and autocorrelation problems, this study considers LSDVC results as the main result of this study. Thus, by using LSDVC, this study found only a negative relationship between GE and HRP and no relationship between taxes, inflation and HRP. This study aims to contribute to the findings of previous studies. In addition to theoretical and methodological contributions, the results of this study are useful for OECD developed and developing countries to understand the impact of various taxes, GE and inflation on HRP. The results may also provide important guidance to policy makers in developing countries who are considering the application of various types of taxes.

Keywords: Government Effectiveness, House Real Price, Inflation, LSDVC, OECD, Tax on Goods & Services, Tax on Personal Income, Tax on Property

Introduction

Real estate is a special object in the market due to its heterogeneity, illiquidity, high transaction costs and fixed location. Therefore, real estate investment and development are considered as local economic activities (Onofrei, 2012). Therefore, it might be necessary to determine how the prices of real estate will change. In other words, to find the effective elements to increase or decrease the prices. Although real estate can be divided into four subsectors, namely residential, retail, hospitality, and commercial, the focus of this study is on the residential sector. Residential real estate investment is an important investment worldwide through which many people have increased their wealth in the past (Amri & Tularam, 2012; Khatibi et al., 2002; Salem & Chaichi, 2018; Das 2021; Nejad et al., 2020). Predicting house prices is important for government agencies, insurance companies, and the real estate industry (Amri & Tularam, 2012; Yousefinejad et al., 2018). One of the effective factors affecting house prices, according to previous studies, are taxes, such as property tax (TOP) and goods and services tax (TGS) (Onofrei, 2012; Elinder & Persson, 2017; Sharma, 2020; Dippel & Sauers, 2020). The market price of houses is affected by government or tax policies, leading to a significant increase in prices (Amri & Tularam, 2012; Das, 2021). Abelson et al (2005) believe that a combination of high inflation and taxation leads to increased demand for housing. Based on Adam Smith's theory, if demand increases, prices will also increase.

Therefore, this study examines the impact of three different types of taxes, namely property tax (TOP), goods and services tax (TGS), and income tax (TPI), on real house prices (HRP) in OECD countries consisting of both developed and developing countries over the period from 2000 to 2019. Since inflation and government effectiveness (GE) are important economic variables for the economic situation of countries, this study also examines the relationship between inflation and GE on HRP. The sample of this study consists of OECD countries because the OECD database is the only available database for collecting data on various taxes and house prices.

Taxes on general and individual goods and services are significant government revenue sources (Chan & Lou, 2015). The initial effect of TGS is on the prices of goods and services (Sharma 2020). TGS give an impact on the construction sector, which involves the raw material of the housing. In this matter, all the raw material cost will have included with TGS, and it's given a chance for the developer to increase the housing prices.

According to Rosenthal (2005), house prices are determined by domestic home property tax. The property tax may be calculated by a small variance in property criteria,

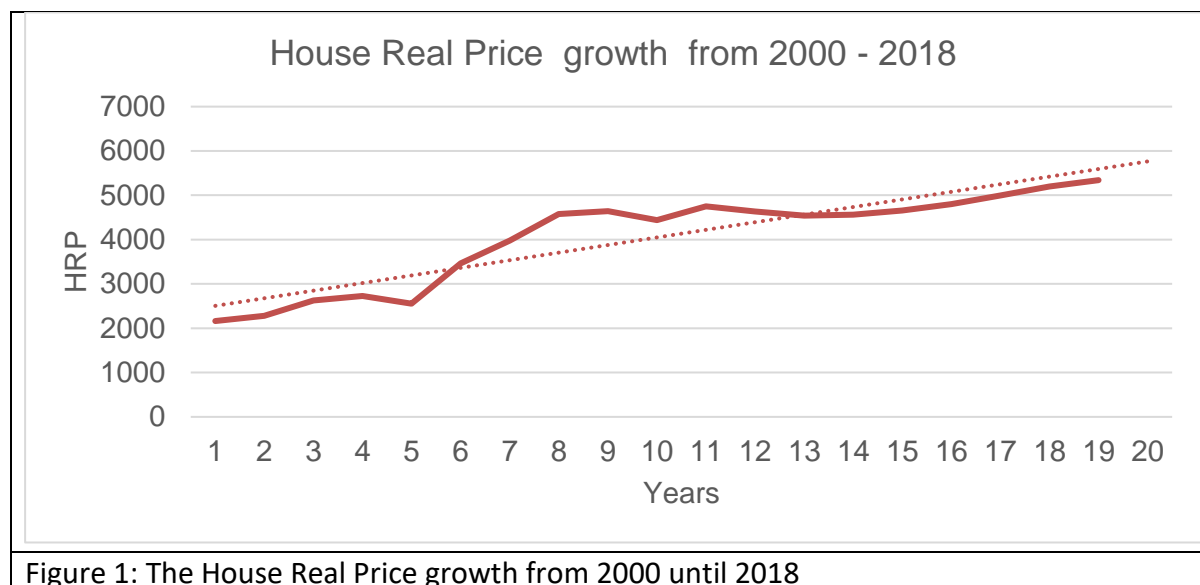
which also has beneficial consequences for the buildings' sector. According to an analysis of the influence of property tax on housing prices in the Apulia Region (Italy) (Tajani et al., 2017), property tax will affect the house prices. Other than that, the Income-tax will affect housing value in a small chance because if the individual has a high income or moderate, it will not directly affect the housing performance (Tajani et al., 2017). However, since a change in income taxation can have an important effect on the investment choice (Manganelli et al., 2020; Poon & Roslan, 2022), this study supposes that when the personal income increase, the demand to buy a house also will increase, then personal income tax may affect house prices.

The growth of HRP can be observed in Table 1, which provides a summary of HRP from 2000 until 2018. The information in Table 1 was obtained from the OECD Database from 2000 until 2018. As can be seen from this table, the total HRP has increased by 61 per cent from 2000 to 2018. There is a dramatic increase in HRP of OECD countries from USD2162.4 million in 2000 to USD5341.3 million in 2018.

Table 1
Percentage of changes of HRP from 2000

Years	HRP	Percentage of changes from 2000
2000	2162.4	
2001	2280.40	5%
2002	2623.4	20%
2003	2728.2	22%
2004	2557	14%
2005	3465	51%
2006	3977.2	52%
2007	4576.4	61%
2008	4638.5	54%
2009	4439.7	49%
2010	4748.8	58%
2011	4636.9	52%
2012	4542.5	51%
2013	4560.6	53%
2014	4653.7	55%
2015	4800	57%
2016	4994.4	59%
2017	5196.7	61%
2018	5341.3	61%

This growth also is observable in figure 1, which shows the HRP growth through a line chart. This impressive HRP growth in OECD countries may be because of increasing taxes and some economic variables such as Inflation and GE.



This high growth makes OECD countries a great opportunity for researchers to explore the factors that affected HRP. The HRP growth from 2000 until 2018 also provides an opportunity for further research to examine whether TPI, TGS, TOP, Inflation, and GE can affect this impressive growth or not. Evidence from past studies on HRP changes in OECD countries is inconclusive, especially concerning the effect of TPI, TGS, TOP, Inflation, and GE on HRP.

Besides investigating the effects of taxes on HRP, this study also examines the effect of two economic indicators, inflation, and government effectiveness, on HRP. There are many economic theories that indicate house price should affect the economy and vice versa. Two of the key drivers frequently cited in the recent run-up in house prices have been the rising income levels and Inflation (Naji & Maryam, 2011). Inflation is included in this study since price instability is one source of uncertainties (Zainuddin & Yusof, 2020). Inflation is identified as the key driver of real house prices (Tsatsaronis & Zhu, 2004). Therefore, this study considers inflation as an economic indicator that may affect the OECD countries' real housing prices.

Political and public interest in housing conditions in developing countries is a relatively recent phenomenon (Tibaijuka, 2008). In recent decades, there have been tremendous advances in housing in developed countries. In contrast, many developing countries face stalled development, stagnation, and even deterioration in housing conditions. The intrusion of government-designed market mechanisms into the housing sector in many poor developing countries does not solve the housing problem, but rather ensures a rapid increase in slums. More and more poor people who dream of better living conditions in urban areas become victims of market forces because they are unable to create effective demand in housing markets (Tibaijuka, 2008). As far as I know, no study has yet examined the relationship between government effectiveness and housing prices. Therefore, it is necessary to examine the impact of government effectiveness on HRP in developed and developing countries.

The outcomes of this study would provide important inputs to policymakers of not only developed countries but also policymakers of developing countries. Findings of this study will encourage policymakers of countries to pay more attention to their infrastructures, such as fiscal and taxation policies to control house prices. Additionally, feedback on policy

implementation's effectiveness can help policymakers plan a way forward and take action for improvements.

This study is organized as follows. The next section provides a brief review of the relevant literature, followed by a discussion of hypothesis development, research design and sample, research models and findings. The final section presents the limitation of the study and suggestions for future research.

Literature Review

Studies that examined the effects of taxes on house prices show mixed results. Some of the previous studies found a positive effect of taxes on house prices. For example, Tajani et al (2017) show that socio-economic variables such as gender, age and income, and taxes like property tax can influence Italy's housing prices. They show property tax and income give positive reaction towards housing prices. Chan et al (2015) found property taxes represent a significant positive effect on property prices in Australia and China. Lin et al (2018) conducted a study in Taiwan and showed a positive effect of taxes on house real prices in long-run.

Similar to the above findings, Zainal et al (2016) consider Malaysia and concluded that building materials and land acquisition are the major construction capital costs affected by the TGS. As well, Best and Kleven (2017) investigated housing market responses to transaction taxes in the U.K. and indicated that the housing market responds very strongly and quickly to transaction taxes. Capozza et al (2020); Hong (2020) show personal income tax affect investors' behaviour then reflected in higher house prices in the United States. They found that individual income tax included with property shows a significant positive value towards house rent and real prices. Finally, Manganelli et al (2020); Abdul Latif et al (2020) investigated the effect that property taxation has on investment in the real estate market. The study found a close relationship between investments in the real estate market and taxes, local communities, public policies, and economic development. The results showed that a change in income taxation could have an important effect on investment choice.

Despite the studies mentioned above, some studies also show negative or no effects of taxes on house prices. Lutz (2016) examined the connection between property tax and house prices and found house price will not respond to tax on property enhancement. Elinder and Persson (2017) show that house prices generally did not respond to a substantial cut in the national property tax in Sweden. Sommer and Sullivan (2018) examined the effect of tax on house prices in the United States. The study found there is a negative effect of tax on house prices. Lin et al (2018) investigated the impact of property taxation on housing markets in Taiwan and found property tax system cannot impact the long-run housing demand. Moreover, He (2018) found tax on the property leads to reduce house prices in China. Carrington et al (2019) investigated the impact of tax variables and subsidy policy on real house prices. The results show that the equilibrium price of housing is negatively associated with income tax rates in Australia. Finally, Bimonte & Stabile (2019) tested whether the introduction of the property tax into the Italian system has dampened construction activity and found there is no effect.

According to this literature review, past empirical studies show mixed findings on the impact of taxes on house prices. For example, some studies found a reduction in house prices following the tax on property or tax on goods and services, while similar studies in other countries show the opposite. This result indicates that the effect of taxes could be contingent upon other factors such as the countries environment, background of countries that implemented taxes and especially economic factors, such as inflation and government

effectiveness. Therefore, it is difficult to conclude whether taxes drives house prices enhancement or not. The mixed evidences provide an opportunity to shed further light on the debate surrounding the effects of taxes and examine whether taxes can affect developing and developed countries through house prices enhancement. The mixed evidences also provide an opportunity for further studies by examining whether different types of taxes can affect house prices of developing countries in the same way as developed countries or considering their transitional economies, less market efficiency, and weak legal enforcement, their taxes implementation affect their house prices more. Therefore, this study investigates the impact of different type of taxes, TPI, TGS, TOP on HRP of OECD countries that consist of both developed and developing countries.

Besides investigating the effects of taxes on HRP, this study also examines the effect of two economic indicators, inflation, and government effectiveness. As mentioned before, the mixed results of previous studies illustrate the effect of taxes could be contingent upon other factors such as the countries environment, some economic factors, such as inflation and government effectiveness. There are many economic theories that indicate house price should affect the economy and vice versa. Two of the key drivers frequently cited in the recent run-up in house prices have been the rising income levels and the inflation (Naji & Maryam, 2011). Inflation is included in this study since price instability is one of the sources of uncertainties (Zainuddin & Yusof, 2020). Naji & Maryam (2011) investigates the existence of causality among house prices, economic growth, and Inflation in Iran and found significant causality between economic factors such as inflation and house prices. Zainuddin and Yusof (2020) also examined whether the house prices in Malaysia is being affected by fundamental factors such as inflation, interest rates and the cost of renting. The study found a significant relationship between Inflation and house prices. However, as can be seen, there are limited studies which have tested this relationship.

Additionally, there is no study which has tested the effect of government effectiveness on house prices. Therefore, this study attempts to fill this gap by investigating the relationship between inflation, government effectiveness, and HRP in OECD countries which is consist of developed and developing countries. Figure 2 illustrates the research framework of this study. As can be seen, there are five independent variables, Tax on Personal Income (TPI), Tax on Good and service (TGS), Tax on Property (TOP), inflation and Government Effectiveness (GE). A dependent variable is House real price (HRP).

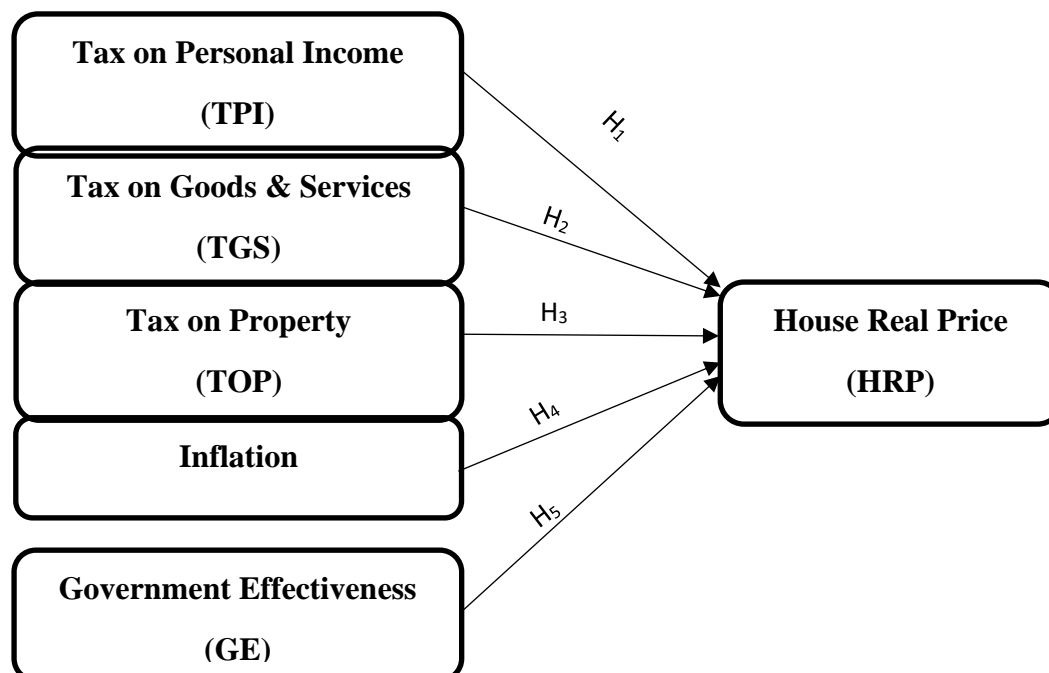


Figure 1: Research Framework and Research Hypotheses

The figure shows that five main hypotheses are tested to answer the proposed five research objectives. This figure also illustrates there is a relationship between Tax on Personal Income (TPI) and House Real Price (HRP) (Hypotheses1). The figure also shows there is a relationship between Tax on Good and Service (TGS), Tax on Property (TOP) and HRP (Hypotheses 2 and 3). Additionally, this study hypothesizes that there is a positive relationship between inflation and HRP (Hypothesis 4), and there is a negative relationship between Governance Effectiveness (GE) and HRP (Hypothesis 5).

Methodology

Empirical studies can be carried out using either quantitative or qualitative approach (Yin 1989). Qualitative research methods are valuable in providing rich descriptions of complex phenomena, tracking unique or unexpected events to develop theories and moving towards explanations (Sofaer, 1999). Simultaneously, quantitative method is used in studies with well-defined research problems and clearly stated hypotheses (Yin, 1989). The main objective of this study is to investigate whether Tax on Personal Income (TPI), Tax on Goods & Services (TGS), and Tax on Property (TOP) affect House Real Price (HRP). On the other side, this study looks at the association between TPI, TGS, TOP, Inflation, and GE on HRP to examine the effect of Inflation and Government Effectiveness (GE) on HRP. Therefore, this study takes a quantitative approach and applies panel data design.

Sample Selection

This study uses purposive sampling method for sample section. All countries listed on the OECD database, 49 countries, are potential sample of this study. Countries with missing or incomplete data are excluded from the sample list. The period of study covers a period of 19 years from 2000 to 2018. 2018 was chosen because it was the period with the latest available data when this study commenced.

Data Collection

Data for this study was obtained from the OECD database from 2000 to 2018. This study investigates the effect of TPI, TGS, TOP, Inflation, and GE on HRP. Therefore, this study's dependent variable is house real price (HRP), whereas the independent variables are TPI, TGS, TOP, Inflation, and GE. Measurements of dependent and independent variables are illustrated in Table 3.

Table 3

Measurement of Variables

Description	Measurement	Variable	Source
House Real Price	Consumer Expenditure	Dependent Variables	OECD Database
Tax On property	% Taxation	Independent Variables	OECD Database
Tax on personal income	% Taxation	Independent Variables	OECD Database
Tax on Goods and Services	% Taxation	Independent Variables	OECD Database
Inflation	Annual % from GDP	Independent Variables	World Bank Database
Government Effectiveness	Annual % from public quality	Independent Variables	World Bank Database

Data Analysis and Method

In order to find answers to the research questions, this study develops 5 hypotheses which are then tested based on a regression model specified, as discussed below.

$$HRP_{i,t} = \beta_0 + \beta_1 TPI_{i,t} + \beta_2 TGS_{i,t} + \beta_3 TOP_{i,t} + \beta_4 Inflation_{i,t} + \beta_5 GE_{i,t} + \varepsilon_{i,t}$$

Where;

<i>HRP</i>	Is house real price
<i>TPI</i>	Is Tax on Personal Income, % taxation
<i>TGS</i>	Is Tax on Goods & Services, % taxation
<i>TOP</i>	Is Tax on Property, % taxation
<i>Inflation</i>	Is inflation, % of GDP
<i>GE</i>	Is government effectiveness

As highlighted earlier, studies that examined the relationship between different types of tax, Inflation, and GE and HRP are limited and inconclusive as they showed mixed results. Thus far, all the available studies on this area applied a statics panel and Ordinary Least Squares (OLS) estimator to test the relationship between the variables. In examining the relationship between taxes, inflation, GE and HRP, there may exist an endogeneity problem that is not addressed via the use of the OLS estimator.

The presence of individual-specific effects of lagged dependent variables and the potential endogeneity of independent variables makes traditional panel estimators such as OLS inappropriate (Nickell, 1981). One of the solutions introduced in previous studies to address the problem of potential endogeneity is the GMM estimator. However, the GMM estimator is designed for situations with small time series and large cross sections. Therefore,

it is not appropriate for this study because it considers OECD countries over 19 years. Bruno (2005) developed the bias-corrected least square dummy variable (LSDVC) for short dynamic panels with fixed effects. LSDVC is indeed an alternative method for GMM to estimate fixed-effects dynamic models, designed for small datasets (Bruno, 2005; Nejad et al., 2018). To the best of my knowledge, no study has applied LSDVC to examine the relationship between taxes, inflation, GE, and HRP. Therefore, to address the endogeneity problem, this study uses least square dummy variable bias corrected (LSDVC) to examine the relationship between TPI, TGS, TOP, inflation, and GE on HRP.

Descriptive Statistics

Descriptive analysis illustrates the data screening process carried out prior to regression analysis, to check data accuracy, missing data, outliers, and deviation from basic assumption for regression analyses (Tabachnick & Fidell, 2007). Table 4 illustrates the descriptive statistics of data in this study. As can be seen, the total number of observations in this study is 564, which is collected from 2000 until 2018. The maximum value of HRP is 175.20, while the minimum value is 43.50, which shows the difference between the highest and lowest house price in OECD countries.

Table 4

Descriptive Statistic

	HRP	INFLATION	GE	TOS	TPI	TOP
Mean	97.2296	2.1060	1.3760	31.9732	24.5293	5.8777
Median	97.3000	1.9249	1.4938	31.3800	22.5900	5.2770
Maximum	175.2000	15.4023	2.3540	61.6800	55.9800	34.1780
Minimum	43.5000	-4.4781	-0.1534	15.6900	4.3300	0.6950
Skewness	0.4636	1.7993	-0.5792	0.4705	0.6852	1.1240
Kurtosis	4.1737	10.2906	2.5452	3.6531	3.3347	7.8344
Observations	564	564	564	564	564	564

The normality of data distribution can be determined based on descriptive statistics. The value of skewness and kurtosis provides an indication of the distribution of data. When the value for skewness is zero, and the value of kurtosis is three, data distribution is said to be normal (Gujarati & Porter 2009). Based on Table 4, the values of skewness range from 1.7993 to -0.5702 while the values for kurtosis range from 10.2906 to 2.5452, indicating a non-normal data distribution. However, according to Hayes (2013), normality is one of the least important in linear regression analysis. Thus, the non-normal distribution of data in this study is not likely to be an issue. Additionally, past studies argue that non-normality is not a significant concern when involving financial data. A non-normal distribution has been accepted as a stylized fact for studies in taking financial data (Abdul Rahim, 2011; Nejad et al., 2020).

Multicollinearity

Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated (Sekaran & Bougie, 2016). According to Gujarati and Porter (2009), the presence of multicollinearity could affect the precision of multiple regression analysis as it makes the estimates of regression coefficients unreliable.

The correlation values of less than 0.8 show that there is no collinearity issue among variables (Gujarati & Porter 2009).

Table 5
Correlation between variables

	HRP	INFLATION	GE	TGS	TPI	TOP
HRP	1.000					
INFLATION	0.158	1.000				
GE	-0.413	-0.232	1.000			
TGS	0.114	0.203	-0.453	1.000		
TPI	-0.266	-0.009	0.600	-0.430	1.000	
TOP	-0.067	-0.110	0.156	-0.405	0.246	1.000

Ordinary Least Square Findings

Table 6 presents the results for the regression model. Based on this table, only Tax on Goods and Services (TGS) (coefficient value -0.3634, t-stat -2.7398), is negatively and significantly related to House Real Price (HRP) at 1 per cent level. This finding confirms that the HRP does not have a positive relationship with TGS, when the tax on goods and services are increased, the house prices will be reduced in OECD countries. TGS give an impact on the construction sector, which involves the raw material of the housing. Therefore, enhancement on TGS may lead to reduce the demand for the house, and eventually lead to reduce the prices. The findings are consistent with the previous studies which show a negative relationship between taxes and HRP (Lutz, 2016; Elinder & Persson 2017; Sommer & Sullivan 2018; Carrington et al., 2019; Bimonte & Stabile, 2019; Nguyen et al., 2019). OLS results also show, there is no relationship between TPI, TOP, and HRP in OECD countries.

Table 6
Ordinary Least Square (OLS) Results

	Coefficient	Std. Error	t-Statistic	Prob.
TGS	-0.3634	0.1327	-2.7398	0.0063***
TPI	-0.1489	0.1064	-1.3996	0.1622
TOP	-0.1718	0.2435	-0.7055	0.4808
INFLATION	0.9112	0.4263	2.1376	0.0330**
GE	-16.5008	2.0908	-7.8921	0.0000***
R-squared	0.3858			
F-statistic	25.6323			
Prob(F-statistic)	0.000***			
Durbin-Watson	0.1467			

$$HRP_{i,t} = \beta_0 + \beta_1 TPI_{i,t} + \beta_2 TGS_{i,t} + \beta_3 TOP_{i,t} + \beta_4 Inflation_{i,t} + \beta_5 GE_{i,t} + \varepsilon_{i,t}$$

*, **, *** represent significance at the 10, 5 and 1 per cent levels, respectively.

Refer to Table 3 for detailed measurement. The variables listed also are defined in Table 3.

On the other side, OLS results show the negative relationship between Governance Effectiveness (coefficient value -16.5008, t-stat -7.8921) HRP at 1 per cent level. A negative relationship means that less governance effectiveness leads to higher house price in OECD countries. The findings presented in Table 6 also show that there is a positive and significant relationship between Inflation and HRP (coefficient value 0.9112, t-stat 2.1376) at 5 per cent level. The findings suggest that the high level of inflation affect house price enhancement.

Table 6 also shows the adjusted R2 of this model is 0.38. This result means that 38 per cent of the changes in HRP can be explained by the applied explanatory variables.

Based on the main OLS regression analyses results, it can be concluded hypotheses 2,4, and 5 are supported. However, it feels important to discuss the Durbin-Watson (DW) value reported in Table 6. The Durbin-Watson is the number which indicates the autocorrelation of the residuals from a statistical regression analysis. According to Field (2009), values of less than 1 and greater than 3 pose a cause for concern. Therefore, the problem of serial autocorrelation can be neglected in the tested model by this study.

According to Greene (2002); Rogmans (2013), the presence of autocorrelation does not lead to biased estimates of the coefficients in the models. However, it potentially leads to underestimating the standard errors of the coefficient, leading to an overestimation of the t-statistics and thereby the possibility that certain variables in the model are interpreted as significant whereas they may not be. In the case of tested model, variables that are found to be significant are TGS, GE and Inflation, which have significant relationships with HRP at 1 and 5 per cent. It is unlikely that a correction for autocorrelation through an increase in the standard error term would alter these models' conclusions. However, this study applies LSDVC, which is considered as the estimation method for heteroscedasticity and autocorrelation detection. Therefore, another reason for this study other than OLS, LSDVC is applied, are heteroscedasticity and autocorrelation detection. The next section discusses the results of LSDVC.

Bias Corrected Least Square Dummy Variable (LSDVC) Findings

Some relationships are dynamic and panel data allows us to understand adjustment. Dynamic relationship means the dependent variable does not necessarily respond immediately to changes in the independent variable. The main issue in the dynamic panels is endogeneity and method of estimation (Bogliacino et al., 2012). While Arellano and Bond (1991) introduced the Difference-GMM as an appropriate estimator for solving the Endogeneity, Blundell and Bond (1998) improved the Difference-GMM and developing the System-GMM as a more appropriate estimator in the case of Endogeneity. However, recent studies found that both difference-GMM and System-GMM perform poorly when the panel is characterized by a low number of cross-sections (Bogliacino et al., 2012; Bruno, 2005). Since the sample of this study included OECD countries only, therefore this study used the proposed Least Squares Dummy Variable Bias-Corrected (LSDVC). Table 7 shows the results of the model with lag for the dependent variable, HRP.

Table 7

Bias Corrected Least Square Dummy Variable (LSDVC) Results

	Coef.	P>z
HRP L1.	0.9818	0.0000***
TGS	0.0713	0.7550
TPI	-0.3747	0.1490
TOP	0.3116	0.3060
GE	-0.4896	0.0310**
Inflation	-0.1037	0.6540

$$HRP_{i,t} = \beta_0 + \beta_1 TPI_{i,t-1} + \beta_2 TGS_{i,t-1} + \beta_3 TOP_{i,t-1} + \beta_4 Inflation_{i,t-1} + \beta_5 GE_{i,t-1} + \varepsilon_{i,t}$$

*, **, *** represent significance at the 10, 5 and 1 per cent levels, respectively.

Refer to Table 3 for detailed measurement. The variables listed also are defined in Table 3.

The difference between the tested model for OLS and tested model for LSDVC is lag consideration. As can be seen in Table 7 the results illustrate that only government effectiveness is associated with HRP (at 0.05). This result is consistent with OLS findings. Other variables such as TGS, TPI, TOP and Inflation do not have an association with HRP. As mentioned before, due to low DW reported by OLS results, it is required to proceed with an estimation technique that can solve autocorrelation and heteroscedasticity problems. Therefore, this study considers LSDVC results as final results.

Conclusion

The main objective of this study is to investigate the impact of goods and services tax (TGS), income tax (TPI) and property tax (TOP) on the real price of houses (HRP). For further understanding, this study also examines the effects of two economic variables, governance effectiveness (GE) and inflation, on HRP. This study examines the relationship between the variables in OECD countries (564 observations). This study establishes a regression model to test the hypotheses and uses the ordinary least squares (OLS) method. Due to the possible endogeneity problem between the variables and the fact that the HRP does not necessarily respond immediately to changes in taxes, GE and inflation, the relationship between the variables is dynamic and OLS is therefore inappropriate. Therefore, LSDVC is also used in this study to examine the relationship between the variables.

In this study, five hypotheses were developed to answer the five specific research questions. The OLS results show the negative relationship between TGS and HRP, which could be due to the fact that most of the countries in the OECD database are developed countries. Therefore, the results could be different for a sample of developing countries. This study leaves these issues for future research. The regression results for the fourth and fifth hypotheses (H4 and H5) show that GE has a negative and significant relationship with HRP. In contrast, inflation has a positive and significant relationship with HRP. Finally, the OLS results show that there is no relationship between TPI, TOP and HRP in OECD countries.

The results of the LSDVC analyses support the results of the OLS analysis for the fifth hypothesis only, showing that GE has a negative and significant relationship with HRP in OECD countries. As mentioned earlier, the relationship between variables in this study could be dynamic as economic factors contribute to the promotion of accounting standards (Al-Akra et al., 2010; Zehri & Chouaibi, 2013). In addition, there might be an endogeneity problem as taxes may influence the improvement of HRP, while HRP may also influence countries' decisions to adopt taxes. Therefore, this study considers the dynamic nature and endogeneity problem, and investigates the effects of taxes, inflation, and GE on HRP using LSDVC, which is more suitable for solving dynamic association, endogeneity, and autocorrelation problems. Therefore, in this study, LSDVC results are considered as the main result of this study.

In addition to the theoretical and methodological contributions, the results of this study are useful for OECD developed and developing countries to understand the impact of various taxes, GE, and inflation on HRP. The results of this study would provide important inputs not only to policy makers in developed countries but also in developing countries. The results of this study will encourage country policymakers to pay more attention to their infrastructure, such as tax and fiscal policies, and government policies to control housing prices. In addition, feedback on the effectiveness of policy implementation can help policymakers plan a way forward and take action to improve.

References

- Abdul Rahim, R. (2011). Impact Of Crisis On Stock Market Integration: Evidence From Asean-5 Plus 3+1 Countries. *Discussion Paper of the Faculty of Economics and Management-UKM*. Available:[Http://www.Ukm.My/Fep/Pub](http://www.ukm.my/fep/pub). Accessed on [2012-6-8].
- Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58(2), 277. <https://doi.org/10.2307/2297968>
- Best, M. C., & Kleven, H. J. (2017). *Housing Market Responses to Transaction Taxes : Evidence From Notches and Stimulus in the U . K*. 1–37. <https://doi.org/10.1093/restud/rdx032>
- Bimonte, S., & Stabile, A. (2019). The impact of the introduction of Italian property tax on urban development: a regional regression model. *Housing Studies*, 0(0), 1–23. <https://doi.org/10.1080/02673037.2019.1594711>
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)
- Bogliacino, F., Piva, M., & Vivarelli, M. (2012). R&D and employment: An application of the LSDVC estimator using European microdata. *Economics Letters*, 116(1), 56–59. <https://doi.org/10.1016/j.econlet.2012.01.010>
- Bruno, G. S. F. (2005). Estimation and inference in dynamic unbalanced panel-data models with a small number of individuals. *Stata Journal*, 5(4), 473–500. <https://doi.org/The Stata Journal>
- Carrington, S. J., Li, B. O. B., & Larkin, M. P. (2019). *The Role of Tax and Subsidy Policy in Driving Australian House Prices **. 1–21. <https://doi.org/10.1111/1475-4932.12457>
- Elinder, M., & Persson, L. (2017). House price responses to a national property tax reform. *Journal of Economic Behavior and Organization*, 144, 18–39. <https://doi.org/10.1016/j.jebo.2017.09.017>
- Greene, W. H. (2002). *Greene Econometric Analysis* (Fifth Edit).
- Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics, Fifth Edition* (Fifth). Mc Graw Hill.
- He, X. (2018). *Under the general equilibrium perspective of house price decision model : An empirical research of the effect of the property tax of China Abstract :*
- Lin, S., Li, J., Hsieh, J., Huang, X., & Chen, J. (2018). Impact of Property Tax on Housing-Market Disequilibrium in Different Regions : Evidence from Taiwan for the period 1982 – 2016. *Sustainability*, 2003. <https://doi.org/10.3390/su10114318>
- Lutz, B. F. (2016). The Connection Between House Price Appreciation and Property Tax Revenues *. *JSTOR*, 61(3).
- Manganelli, B., Morano, P., & Rosato, P. (2020). *buildings The E f f ect of Taxation on Investment Demand in the Real Estate Market : The Italian Experience*.
- Naji, A. A., & Corresponding, M. (2011). *House prices , Economic Output , and Inflation Interactions in Iran*. 3(1), 1–13.
- Nejad, M. Y., Ahmad, A., & Rahim, R. A. (2020). Does IFRS Drive Information Asymmetry Reduction? Evidence from Asean-6 Countries. *Asian Journal of Accounting and Governance*, 14(0).
- Nguyen, H. N., Tham, J., Khatibi, A., & Azam, S. M. F. (2019). Enhancing the capacity of tax authorities and its impact on transfer pricing activities of FDI enterprises in Ha Noi, Ho Chi Minh, Dong Nai, and Binh Duong province of Vietnam. *Management Science Letters*, 9(8), 1299–1310. <https://doi.org/10.5267/j.msl.2019.4.011>
- Poon, A. E., & Roslan, N. H. (2022). The Effect of Enterprise Risk Management (ERM)

- Implementation on SMEs Performance in Malaysia. *Malaysian Journal of Social Sciences and Humanities*, 7(4).
- Rogmans, T. (2013). The determinants of foreign direct investment in the Middle East North Africa region. *International Journal of Emerging Markets*, 8, 240–257. <https://doi.org/10.1108/17468801311330310>
- Sekaran, U., & Bougie, R. (2016). *Research Methods For Business: A Skill Building Approach* (7th Editio). Wiley.
- Sharma, U. (2020). Pre and post Implementation Impact of GST on the shopkeeper. *Mukt Shabd Journal*, IX(V), 4857–4868.
- Sofaer, S. (1999). Qualitative methods: what are they and why use them? *Health Services Research*, 34, 1101–1130.
- Sommer, B. K., & Sullivan, P. (2018). *Implications of US Tax Policy for House Prices , Rents , . 108(2)*, 241–274.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics*.
- Tsatsaronis, K., & Zhu, H. (2004). What Drives Housing Price Dynamics: Cross-Country Evidence. *BIS Quarterly Review*, February 2004.
- Yin, R. K. (1989). Case study research: Design and methods. *Applied Social Research Series*, London: Sage.
- Yousefinejad, M., Ahmad, A., & Rahim, A. (2018). The Mediating Effect of Information Asymmetry on IFRS and Foreign Direct Investment. *International Journal of Economics and Management*, 12(September), 641–656.
- Zainuddin, Z., & Yusof, R. M. (2020). *DO INFLATION , INTEREST RATE AND COST OF RENTING AFFECT THE PRICE OF TERRACE HOUSES IN PENANG ? 18(3)*.