

Investor Behavior and the Value of Tax Deferral: An Analysis of Real Estate Tax-Deferred Exchanges

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Abstract

Section 1031 of the Internal Revenue Code permits corporate and individual taxpayers to defer the recognition of taxable gains on dispositions of business-use or real property investment. Section 1031 exchanges are widely used, especially in states with high income tax rates. The economic rationale associated with providing enhanced capital gain deferral benefits to one class of investments has been questioned by academics and practitioners but the commercial real estate industry has long argued that by reducing potential lock-in effects the availability of tax-deferred exchanges increase the ability of investors to redeploy capital to other uses and/or geographic areas. Proponents also argue the tax savings produced by exchanges allow owners to upgrade and expand the productivity of buildings and facilities, reduce the use of leverage, and otherwise engage in more income and job creating spending with positive spillover effects to related industries. Despite these claims, careful estimates of the magnitude of exchange tax-deferral benefits are lacking and no direct evidence exists on the extent to which the availability of Section 1031 exchanges alters investor behavior. This paper addresses these gaps in the literature. We first develop a “micro” model that quantifies the present value of an exchange to the property owner. We estimate that the incremental value of a CRE exchange as a percentage of the investor’s deferred tax liability ranges from 10 percent to 62 percent. Next, using unique property level transaction data, we examine empirically the effects of tax deferral on investment, transaction activity, the use of leverage, and other borrower behavior.

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1. Introduction

The U.S. Internal Revenue Code contains hundreds of “tax expenditures” for corporate and individual taxpayers. According to the Office of Management and Budget (OMB), these expenditures added up to more than \$1.4 trillion in 2016 and the fairness and efficiency of many of these preference items are frequently debated (e.g., Burman, Geissler, and Toder, 2008). A tax expenditure estimate produced by OMB or the Joint Committee on Taxation (JCT) is not the same as a revenue estimate for the repeal of the tax expenditure for several reasons. Perhaps most importantly, tax expenditure estimates do not incorporate the effects of behavioral changes among taxpayers that would occur in response to the repeal of the expenditure. Evidence at the taxpayer or asset level on the extent to which tax expenditures (“preferences”) alter taxpayer behavior is difficult or impossible to obtain.

Section 1031 of the Internal Revenue Code permits corporate and individual taxpayers to defer the recognition of taxable gains on the disposition of business-use or investment assets. By deferring tax liabilities, investors reduce the effective tax rate on the investment and their tax-adjusted user cost of capital, which promotes investment in the asset class.¹ Section 1031 exchanges are widely used, especially in states with high income tax rates. In 2004, an estimated 80 percent of commercial real estate (CRE) transactions on the West Coast of the U.S. involved the use of an exchange by the seller, buyer, or both (McLinden, 2004). Over the 1999 to 2005 time period, Ling and Petrova (2008) report that 32 percent of the apartment transactions in their database involved an exchange; the corresponding percentage for their office sample was 20 percent. JCT (2015) estimated the cost of this tax preference item to be \$87 billion over 2014-2019.

To the extent the use of tax-deferred exchanges leads to reductions in the present value of federal and state income taxes, theory suggests exchanges are associated with asset price and liquidity effects. For example, several studies show that capital gain tax reductions are associated with increased asset prices (Lang and Shackelford, 2000; and Guenther and Willenborg, 1999).

¹ According to recent empirical studies the elasticity of investment with respect to tax-adjusted user cost of capital ranges between -0.25 and -1 (Hassett and Hubbard, 2002 and Hassett and Newmark, 2008).

Another stream of literature establishes strong support for the presence of a lock-in effect when investors are less likely to sell and realize gains when capital gain taxes are high (Malkiel and Kane, 1963; Feldstein et al. 1980; Klein, 1999, 2001; Shackelford and Verrecchia, 2002; Mackie, 2002, Ivkovich et al., 2005). Rather than disposing of a suboptimal asset with a lower expected before-tax return and reinvesting the proceeds in a more productive (higher return asset), investors with accrued capital gains may choose to continue to hold the less productive asset rather than realize the taxable gains. This suboptimal allocation of scarce investment capital exacts a cost on the economy as well as on the taxpayer.

The commercial real estate (CRE) industry has long argued that by reducing potential lock-in effects the availability of tax-deferred exchanges increases the ability of investors to redeploy capital to other uses and/or geographic areas.² Proponents also argue the tax savings produced by exchanges allow owners to upgrade and expand the productivity of buildings and facilities, reduce the use of leverage to finance CRE acquisitions, and otherwise engage in more income and job creating spending with positive spillover effects to industries such as construction, title insurance, and mortgage lending (Federation of Exchange Accommodators, 2013; Fickes, 2003; Wayner, 2005a, 2005b). The enhanced liquidity, the option to exchange provides, is argued to be especially important to the many investors in relatively inexpensive properties that often dominate the market for real estate like-kind exchanges.³

Despite these claims, careful estimates of the present value of exchange-related tax saving are lacking and no direct evidence exists that the availability of Section 1031 exchanges impacts capital investment, transaction frequency, or leverage. Moreover, the economic rationale associated with providing enhanced capital gain deferral benefits to one class of investments has been questioned by academics and practitioners (e.g., Jensen, 1985; Shaviro, 1992; Sullivan, 2015). Perhaps for this

² Papers that address the lock-in effect in real estate markets include Yamazaki (1996), Sinai and Gyourko (2004), Ferreira (2010), and Ihlanfeldt (2011).

³ A 2011 survey by the Federation of Exchange Accommodators (FEA) shows that 36% of all exchange transactions, facilitated by its members, had an average size (as measured by gross sale price of relinquished property) of less than \$500,000; 59% of all transactions had an average sale price of less than \$1,000,000, and 5% of total transactions had an average deal size in excess of \$2,500,000. The survey results suggest exchanges benefit all taxpayers, the vast majority of whom are engaged in relatively modest transactions. Anecdotally, IPX1031, the largest exchange accommodator in the country, reported to the authors that the median sale proceeds from the sale of a relinquished property in 2015 was \$400,000.

reason, as well as their widespread use and perceived cost to the Treasury, recent budgets put forth by the Obama administration and several tax reform proposals from Congressional tax-writing committees would eliminate or curtail like-kind exchanges.⁴

We study the economics of Section 1031 real estate exchanges. We first develop a “micro” model that quantifies the present value of an exchange to the property owner. In addition to capturing the benefit of immediate tax deferral, the model incorporates the corresponding tax disadvantages of an exchange from the investor’s perspective; in particular, reduced depreciation deductions in the replacement property and increased capital gain and depreciation recapture taxes when the replacement property is sold. These disadvantages are often ignored by the typical focus on immediate tax deferral. We estimate that the incremental value of a CRE exchange as a percentage of the investor’s deferred tax liability ranges from 10 percent to 62 percent, depending on the holding period of the relinquished property, the amount of price appreciation experienced by the relinquished property prior to the exchange, and the amount of time the investor expects to hold the replacement property before disposition in a fully taxable sale.

We next employ property level data from Costar and the National Association of Real Estate Investment Fiduciaries (NCREIF) to provide unique evidence on the behavioral effects associated with tax deferral options such as like-kind exchanges. Our empirical analyses suggest like-kind exchanges are associated with increased capital investment, shorter holding periods, and less use of mortgage debt. More specifically, tax-deferred exchanges are associated with an investment in replacement subsequent properties that is, on average, \$305,000 greater (33 percent of value) than when a replacement property is purchased following a fully taxable sale. This increased investment in replacement properties is robust over time and by state, although it tends to be larger in markets that are performing well and in states with higher income tax rates. Capital expenditures (specifically building improvements) for replacement properties purchased to complete an exchange tend to be higher than capital expenditures on otherwise similar non-exchange related acquisitions.

Investors executing like-kind exchanges tend to use less leverage to acquire replacement properties than investors involved in ordinary acquisitions. Holding periods for properties acquired with the use of an exchange tend to be shorter, suggesting the availability of an exchange option

⁴ For example, on February 26, 2014, House Ways & Means Committee Chairman David Camp released a comprehensive tax reform proposal that called for repeal of Section 1032 in its entirety. In December of 2014, Senate Finance Chairman Max Baucus a discussion draft that also proposed the complete elimination of Section 1031.

increases the liquidity of CRE investments. We obtain similar results using a matched sample of exchange and non-exchange properties. In 34 percent of our sample, the replacement property in an exchange is less expensive than the relinquished property, which suggests some taxes were paid in the year the exchange is executed. Furthermore, we show that 88 percent of the investors in our sample that complete an exchange subsequently dispose of the replacement property in a fully taxable sale. That is, like-kind exchanges are not typically used to permanently *exclude* capital gain and depreciation recapture income from taxation; rather, they allow investors to temporally *defer* the recognition of such income. Although none of the analyses we are able to perform with our micro data are empirically definitive on their own, collectively they suggest the availability and use of tax-deferral techniques alters taxpayer/investor behavior.

The rest of this paper is structured as follows. In the next section we briefly discuss the background and mechanics of tax-deferred exchanges. In section 3 we develop our model and estimate the magnitude of tax benefits to users of tax-deferred exchanges. In section 4 we discuss the empirical evidence on the micro-economic benefits and behavioral effects of tax-deferral through like-kind exchanges. Section 5 concludes.

2. Background on Tax-Deferred Exchanges

Like-kind exchanges allow deferral of income taxes on the sale of an asset to the extent the investor uses the proceeds from the sale to acquire another similar-use asset and complies with the regulatory requirements and time limits set by the IRS. Although Section 1031 of the Internal Revenue Code (IRC), which is the basis for like-kind exchanges, dates back to the 1920's, exchanges under the original restrictions could only be completed as a simultaneous swap of properties among two or more parties, which severely limited the use of like-kind exchanges due to difficulties to complete such swaps. An amendment of the original regulation in 1984, which allowed taxpayers more time to complete an exchange and the subsequent issuance of "safe harbor" regulation in 1991 by Internal Revenue Service (IRS) helped promote an active like-kind exchange market. The fair market value (FMV) of like-kind properties received in exchanges by individuals, corporations, and partnership increased from approximately \$58 billion in 1998 to \$220 billion in 2006, as reported by IRS (form 8824).

Most Section 1031 transactions are "delayed" exchanges that involve the use of a qualified intermediary (QI). In a delayed exchange, ownership of the relinquished property is transferred to

the buyer. However, the buyer of the relinquished property transfers the agreed-upon cash amount to the QI, not the selling taxpayer. The cash paid by the buyer of the relinquished property is “parked” with the QI until the taxpayer is able to identify and acquire a replacement property.

The taxpayer must identify in writing the replacement property within 45 days of the sale of the relinquished property. To allow for the possibility the taxpayer may not be able to come to terms with the owner of the potential replacement property, the taxpayer may designate more than one replacement property.⁵ The taxpayer must acquire one or more of the identified replacement properties within 180 calendar days of the date of the closing of the relinquished property; that is, the 45 and 180 day periods run concurrently (Internal Revenue Code Section, Title 26, Section 1031). There are no exceptions to these time limits and failure to comply converts the transaction to a fully taxable sale.⁶ At the closing of the replacement property, the QI transfers cash to the seller of the replacement property and the seller transfers ownership to the taxpayer. The transaction is potentially taxable to the extent that (1) the value of the replacement property is less than the value of the relinquished property and (2) there is cash left over after the purchase of the replacement property.

A like-kind exchange is, strictly speaking, a tax deferral technique. The taxpayer’s basis in the replacement property is set equal to the transaction price of the replacement property minus the gain deferred on the disposition of the relinquished property. If the replacement property is subsequently disposed of in a fully taxable sale, the realized gain will equal the deferred gain on the relinquished property plus any additional taxable gain accrued since the acquisition of the replacement property.⁷ However, if the subsequent disposition of the replacement property is also

⁵ The taxpayer may identify up to three properties of any value or may identify any number of properties so long as the combined fair market values of the properties does not exceed 200 percent of the value of relinquished property. If the first two requirements are violated, the taxpayer can salvage deferred tax treatment by acquiring, within the 180-day exchange period, 95 percent of the value of all properties identified.

⁶ The time period may be less than 180 days, if the due date for filing the taxpayer’s return (including extensions) is less than 180 days from the closing date of the relinquished property.

⁷ In sharp contrast, since May 6, 1997 when the Taxpayer Relief Act of 1997 became law, if a single taxpayer has owned and lived in her home as her principal residence for at least two of the five years prior to the sale, she can permanently exclude up to \$250,000 of her capital gain from taxation. For married couples, filing jointly, the exclusion is \$500,000. This exclusion is potentially far more valuable to a home owner than the potential tax deferral available to owners of income-producing property under Section 1031.

structured in the form of a Section 1031 exchange, the realized gain on the first property can again be deferred, perhaps indefinitely.

In order for the exchanging taxpayer to completely avoid the immediate recognition of the accrued taxable gain, he or she must acquire a property (or properties) of equal or greater value than the relinquished property. In addition, the taxpayer must use all of the net cash proceeds generated from the disposition of the relinquished property to purchase the replacement property. The transaction is potentially taxable to the extent that (1) the value of the replacement property is less than the value of the relinquished property and (2) there is cash left over after the purchase of the replacement property.

In general, both real and personal property can qualify for tax-deferred treatment. However, some types of property are specifically disqualified; for example, stocks, bonds, notes, and ownership interests in a limited partnership or multi-member limited liability company. Both the relinquished property and the replacement property must be held for productive use in a trade or business or held as a “long-term investment.” Thus, personal residences and property held for sale to consumers (i.e., “dealer” property) cannot be part of a Section 1031 exchange. A holding period greater than one year is commonly assumed to qualify the relinquished property as a long-term investment for the purposes of implementing a tax-deferred exchange; however, the one-year rule of thumb has no basis in statutory or case law. Section 1031 requires investors to redeploy the capital from relinquished U.S. property within the U.S.

3. Magnitude of Exchange Tax Benefits

If a taxpayer successfully completes a simultaneous or delayed exchange, all or a portion of the realized taxable gain will be deferred until the replacement property is subsequently disposed of in a fully taxable sale. A portion of the realized gain will be recognized in the tax year in which the exchange occurs to the extent the taxpayer receives cash or other unlike kind property (i.e., “boot”). The present value of income tax deferral is therefore a function of the magnitude of the deferred capital gain, the expected length of time before the replacement property is disposed of in a fully taxable sale (if ever), and the applicable discount rate. All else equal, taxpayers should exchange into the replacement property if the present value of the exchange strategy exceeds the present value of the sale-purchase strategy. In this section we develop a model to estimate the net present value of tax deferral.

Assume a taxpayer who owns real property has decided the risk-return characteristics of her portfolio would be enhanced by disposing of the asset and reinvesting the equity into a replacement property located in a market with more growth potential. Assume also that the replacement property has been identified. The first strategy available to the taxpayer is to dispose of the existing property in a fully taxable sale and then use the net after-tax sale proceeds, along with additional equity capital if necessary, to acquire the replacement property. The second option is to take advantage of Section 1031 of the IRC and exchange out of the existing property and into the replacement property. The second strategy would allow the taxpayer to defer recognition of some or all of the accrued taxable gain.

The present value of the sale-purchase strategy, $PVSALE_t$, assuming all-equity financing, can be represented as

$$PVSALE_t = (ATSP_t^1 - P_t^2) + \sum_{i=1}^n \frac{(1-\tau_o)NOI_i + \tau_o DEP_i^{2,s}}{(1+k)^i} + \frac{P_{t+n}^2 - SC_{t+n}^2 - \tau_{cg} CG_{t+n}^{2,s} - \tau_{dr} RECAP_{t+n}^{2,s}}{(1+k)^n} \quad (1)$$

$ATSP_t^1$ is the net after-tax proceeds from the sale of the existing property at time t ; P_t^2 and P_{t+n}^2 are the acquisition price of the replacement property at time t and the expected sale price of the replacement property in year $t+n$, respectively; NOI_i is the expected annual net cash flow of the replacement property in year i of the expected n -year holding period; τ_o , τ_{cg} and τ_{dr} are the taxpayer's marginal tax rate on ordinary income, the expected tax rate on capital gain income and the expected tax rate on "recaptured" income, respectively; $DEP_i^{2,s}$ is the allowable tax depreciation on the replacement property in year i , conditional on a sale-purchase strategy; k is the seller's required after-tax rate of return on unlevered equity; SC_{t+n}^2 are the expected selling costs on the taxable disposition of the replacement property in year $t+n$; $CG_{t+n}^{2,s}$ is the portion of the expected capital gain on the sale of the replacement property in year $t+n$, conditional on a sale-purchase strategy in year t , that will be taxed at the capital gain tax rate; and $RECAP_{t+n}^{2,s}$ is the portion of the taxable gain on the sale of the replacement property in year $t+n$, conditional on an n -year sale-purchase strategy, that represents "depreciation recapture income."

The first term on the right-hand-side of equation (1) represents the equity capital required at time t under the sale-purchase strategy, and is equal to the after-tax proceeds from a fully taxable

sale minus the acquisition price of the replacement property.⁸ Note that $ATSP_t^1 = P_t^1 - SC_t^1 - TDS_t^1$, where SC_t^1 and TDS_t^1 represent sale costs and total taxes due on sale, respectively. Therefore, if the price of the replacement property is equal to the price of the relinquished property, $ATSP_t^1 - P_t^2$ is equal to total taxes due on the sale of the existing property, plus total selling costs.

The second term on the right-hand-side of equation (1) represents the cumulative present value of the replacement property's net cash flows from annual operations, NOI_t , plus the present value of the annual tax savings generated by tax depreciation. Annual depreciation, $DEP_t^{2,s}$, under the sale-purchase strategy, is equal to

$$DEP_t^{2,s} = \frac{(1-L_t^2)P_t^2}{RECPER} \quad (2)$$

where P_t^2 is the acquisition price of the replacement property, L_t^2 is the percentage of P_t^2 that represents non-depreciable land,⁹ and $RECPER$ is the allowable cost recovery period in years for the replacement real property.¹⁰ Because the replacement property is purchased with the proceeds from a fully taxable sale, the initial tax basis of the replacement property is "stepped up" to equal the total acquisition price, P_t^2 , thereby maximizing allowable depreciation deductions over the expected n -year holding period of the replacement property.

The third and final term on the right-hand-side of equation (1) represents the expected after-tax cash proceeds from the disposition of the replacement property in a fully taxable sale at the end of the assumed n -year holding period. Deducted from the expected selling price at time $t+n$ are the following: expected selling costs (SC_{t+n}^2), the expected tax liability on the portion of the taxable gain

⁸ The use of debt financing on both the relinquished and the replacement property would reduce the amount of after-tax sale proceeds from a taxable sale of the relinquished property and reduce the equity needed to acquire the replacement property.

⁹ We are assuming there is no personal property associated with the acquisition of the replacement property.

¹⁰ Congressional legislation has repeatedly altered the period of time over which rental real estate may be depreciated. As of 2015, residential real property (e.g., apartments) may be depreciated over no less than 27 and 1/2 years. The cost recovery period for nonresidential real property (e.g., shopping centers, industrial warehouses, and office buildings) is 39 years. The calculation of the allowable annual depreciation deduction for real property in the initial and final tax year is complicated by the "mid-month convention. This convention is ignored in the discussion and calculations that follow.

arising from nominal appreciation in the value of the property ($\tau_{cg} CG_{t+n}^{2,s}$), and the expected tax liability on the “unrecaptured” Section 1250 gain ($\tau_{dr} RECAP_{t+n}^{2,s}$). $RECAP_{t+n}^{2,s}$ is equal to the total amount of straight-line depreciation taken on the property since its acquisition. Henceforth, we will refer to the portion of the total gain on sale due to appreciation in the nominal value of the property as the “capital gain” and to the portion of the gain on sale that results from the use of straight-line depreciation as “depreciation recapture income.” Under the tax code in place in 2016, capital gains are subject to a maximum federal tax rate of 23.8 percent. In contrast, the maximum statutory federal rate on depreciation recapture income and ordinary income are 28.8 percent and 43.4 percent, respectively.¹¹ State income tax burdens can significantly increase effective marginal tax rates.

The second disposition option available to the taxpayer at time t is to take advantage of Section 1031 of the IRC and exchange into the replacement property. The present value of the exchange strategy, assuming all-equity financing, can be represented as

$$PVEX_t = P_t^1 - EC_t - P_t^2 - B_t + \sum_{i=1}^n \frac{(1-\tau_o)I_i + \tau_o DEP_i^{2,e}}{(1+k)^i} + \frac{P_{t+n}^2 - SC_{t+n}^2 - \tau_{cg} CG_{t+n}^{2,e} - \tau_{dr} RECAP_{t+n}^{2,e}}{(1+k)^n} \quad (3)$$

where P_t^1 is the selling price of the relinquished property; EC_t is the total transaction cost of exchanging out of the relinquished property and into the replacement property at time t ; B_t is the additional non-like-kind property (i.e., cash or other boot) paid at time t to acquire the replacement property; $DEP_i^{2,e}$ is the depreciation on the replacement property in year i , conditional on the use of an exchange at time t ; $CG_{t+n}^{2,e}$ is the expected capital gain income on the sale of the replacement property in year $t+n$, conditional on an exchange strategy in year t and $RECAP_{t+n}^{2,e}$ is expected

¹¹ The maximum capital gain rate is the sum of the 20 percent maximum statutory capital gain tax rate plus the 3.8 percent Net Investment Income Tax (NIIT) surcharge under I.R.C. §1411 that, since January 1, 2103, applies to married households filing jointly with AGI in excess of \$250,000. From 1997 to May 6, 2003, the maximum capital gain tax rate was 20 percent. From May 6, 2003 to January 1, 2013, the maximum statutory capital gain tax rate was 15 percent. The 28.8 percent maximum rate of tax on depreciation recapture income and the 43.4 percent maximum rate on ordinary income include the 3.8 percent NIIT surcharge. When the Medicare tax, the tax benefit of the Medicare tax (for self-employed), and the impact of phasing out personal exemptions and itemized deductions are included, the marginal rate for individuals in the top 39.6 percent statutory tax bracket can exceed 43.4 percent.

depreciation recapture income on the sale of the replacement property in n years assuming an exchange at time t . All other variables in equation (3) are as previously defined.¹²

If the exchanging taxpayer does not need to pay cash or other unlike-kind property to acquire the replacement property, her tax basis in the replacement property at acquisition is equal to her basis in the relinquished property; moreover, her annual depreciation deduction in the replacement property, $DEP_i^{2,e}$, is equal to the deduction she would have been allowed had she maintained ownership of the relinquished property.¹³ If property prices have increased in nominal terms since the acquisition of the relinquished property, this basis and depreciation carry forward is a disadvantage of exchanging into the property because a stepped-up depreciable basis is not acquired. Similarly, if no boot is paid to acquire the replacement property, the depreciation recapture portion of the total gain on a fully taxable sale of the replacement proportion in year $t+n$, $RECAP_{t+n}^{2,e}$, is equal to the amount of depreciation recapture income that was deferred by the exchange, plus total tax depreciation deducted since the exchange. Although the annual depreciation deduction taken after completing the exchange, $DEP_i^{2,e}$, is lower than what would be allowed under a sale-purchase strategy (i.e., $DEP_i^{2,s}$), $RECAP_{t+n}^{2,e}$ will be generally be larger than $RECAP_{t+n}^{2,s}$ due to the deferred depreciation recapture income.¹⁴

All else equal, the taxpayer should exchange into the replacement property if the present value of the exchange strategy exceeds the present value of the sale-purchase strategy. Subtraction of

¹² For ease of exposition, this representation of the present value of the exchange strategy assumes the disposition of the relinquished property and the acquisition of the replacement property is simultaneous. However, most real estate like-kind exchanges are “delayed” exchanges, which allow the replacement property to be acquired up to 180 days after the disposition of the relinquished property.

¹³ The tax basis in the relinquished property brought forward into the replacement property is sometimes referred to as the “exchange” basis. If the replacement property has a longer recovery period than the relinquished property, the exchange basis is recovered over the remaining life of the relinquished property utilizing the depreciation method of the replacement property. If cash/boot is required to exchange into a more expensive replacement property(s), this additional boot is added to the basis and separately depreciated beginning in the tax year of the exchange over the appropriate 27.5- or 39-year cost recovery period.

¹⁴ If the holding period of the replacement property is sufficiently long relative to the holding period of the relinquished property, it is possible for $RECAP_{t+n}^{2,s} > RECAP_{t+n}^{2,e}$

equation (1) from equation (3) produces the following expression for the incremental NPV of the exchange strategy:

$$\begin{aligned}
INCNPV_t = & [SC_t^1 - EC_t + TDS_t^1 - B_t] - \sum_{i=1}^n \frac{\tau_o (DEP_i^{2,s} - DEP_i^{2,e})}{(1+k)^i} - \frac{\tau_{dr} (RECAP_{t+n}^{2,e} - RECAP_{t+n}^{2,s})}{(1+k)^n} \\
& - \frac{\tau_{cg} (CG_{t+n}^{2,e} - CG_{t+n}^{2,s})}{(1+k)^n}. \tag{4}
\end{aligned}$$

The first term in equation (4) captures the immediate net cash flow benefit of tax deferral. If the time t selling costs of the sale-purchase strategy (SC_t^1) and exchange strategy (EC) are equal, the immediate advantage of the exchange is equal to TDS_t^1 , the deferred tax liability, minus boot paid.

The second term in equation (4) captures the cumulative present value of foregone depreciation tax savings over the n -year holding period of the replacement property. If no boot is paid to acquire the replacement property and nominal price appreciation has occurred since the acquisition of the relinquished property, then $DEP_i^{2,s} > DEP_i^{2,e}$. The depreciation recapture portion of the total gain on a fully taxable sale of the replacement property in year $t+n$ will generally be larger if an exchange was used to acquire the property. This increase in depreciation recapture income, relative to a sale-purchase strategy, decreases the net present value of the exchange strategy at time t .

Finally, because the tax deferral associated with an exchange reduces the tax basis in the replacement property, the taxable capital gain due on a fully taxable sale of the replacement property will be larger with an exchange. The negative effect of the increased capital gain tax liability on the incremental NPV of an exchange is captured by the fourth term in equation (4).

It is important to note that the immediate net benefit of tax deferral, which is often the focus of discussion concerning the tax advantages of real estate like-kind exchanges, is significantly offset by the three disadvantages of using an exchange to acquire a replacement property instead of a taxable sale-purchase strategy. The first disadvantage is that the tax basis in the replacement property is set equal to the taxpayer's basis in the relinquished property (i.e., the "exchange" basis),

plus net boot paid.¹⁵ Moreover, the exchange basis carried forward from the relinquished property is depreciated over the remaining cost recovery period of the relinquished property. This ensures that the annual depreciation deduction on the replacement property is equal to the deduction that would be taken had the taxpayer maintained ownership of the relinquished property. If nominal price appreciation has occurred since the acquisition of the relinquished property, the annual depreciation deduction after the exchange is less than it would be in a sale-purchase, all else equal.

Second, depreciation recapture income when the replacement property is disposed of in a fully taxable sale will generally be larger than with a sale-purchase strategy due to the deferred recapture income.¹⁶ This increased depreciation recapture tax under an exchange, represented by the third term in equation (4), reduces the incremental benefit of an exchange.

Finally, because the deferred gain associated with an exchange reduces the tax basis in the replacement property on a dollar-for-dollar basis, the taxable capital gain due on the disposition of the replacement property in a fully taxable sale will be larger with an exchange relative to a sale-purchase strategy.

Equation (4) is used to estimate the magnitude of the incremental NPV of an exchange, $INCNPV_t$, under a number of assumptions. Estimated values of $INCNPV_t$ are then divided by (1) the price of the relinquished/replacement property; (2) the deferred taxable gain in the year of the exchange; and (3) the deferred tax liability to quantify the economic magnitude of exchange tax benefits.

Model Assumptions

Before estimating the magnitude of exchange benefits, we first calculate the deferred gain, which is equal to the realized gain minus the recognized gain with an exchange. This amount is comparable to the deferred gain on an exchange reported by the taxpayer on line 24 of Form 8824. The realized gain or loss on the sale of the property is equal to the net sale proceeds minus the

¹⁵ Equivalently, the tax basis the replacement property is equal to the value of the replacement property minus the amount of the taxable gain deferred by the exchange. Note that to the extent an exchange is costlier to execute than a fully taxable sale, the additional cost of the exchange must be netted against the positive deferral benefits.

¹⁶ If the holding period of the replacement property is sufficiently long relative to the holding period of the relinquished property, it is possible for depreciation recapture income under the sale-purchase strategy to be greater than under an exchange strategy.

adjusted tax basis at sale. To numerically solve for the realized gain, taxes due on a fully-taxable sale, the deferred gain, and the incremental NPV of an exchange, the following base-case assumptions are employed:

- Price of relinquished and replacement property are equal
- Mortgage debt: same for relinquished and replacement property
- Selling cost of a fully taxable sale: 3 percent of the relinquished property's sale price
- Exchange costs: equal to selling costs of a fully taxable sale
- Ordinary income tax rate: 39.6 percent
- Depreciation recapture tax rate: 25 percent
- Capital gain tax rate: 20 percent
- After-tax discount rate: 6 percent
- Non-depreciable land portion of the relinquished and replacement property's original tax basis: 20 percent (no personal property)
- Relinquished and replacement property are both non-residential real property.

The basis of non-residential real property is depreciated on a straight-line basis over 39 years. The analysis is also performed on residential income property, which is depreciated on a straight-line basis over 27.5 years.¹⁷

The other key assumptions in the quantification of deferred gains and net exchange benefits are (1) the discount rate (2) the number of years since acquisition of the relinquished property (*HOLD¹*), (3) the annualized rate of nominal price appreciation since acquisition of the relinquished property (*r¹*), and (4) the number of years before the replacement property is expected to be disposed in a fully taxable sale (*HOLD²*). An after-tax discount rate of six percent is initially assumed to value the incremental tax benefits of an exchange relative to a sale/purchase strategy. It is important to note that this rate is not intended to reflect the riskiness of an equity investment in commercial real estate, including uncertainty about future rents, operating expenses, and resale prices. These operating and sale cash flows will not vary with the choice of disposition strategy because under both strategies the taxpayer is assumed to acquire the same (replacement) property. Therefore, the discount rate needs only to capture uncertainty about the relative tax savings of an exchange, which are arguably more certain than the changes in rents and sale prices. We examine the sensitivity of our results to changes in the assumed discount rate.

¹⁷ An income-producing property is considered a "residential" property for income tax purposes if at least 80 percent of the gross rental income is derived from the leasing of non-transient dwelling units (hotels and motels are not residential property). The real property associated with mixed-use properties may be depreciated over a 27½-year recovery period so long as the rental income from the retail and/or office tenants does not exceed 20 percent of total rental income.

Deferral Benefits as a Percentage of Price

To quantify the economic significance of the incremental NPV from an exchange, we first divide the incremental NPV by the dollar value of the relinquished and replacement property. Figure 1 presents our base-case results for nonresidential real property. Figure 1A displays the tax savings assuming the relinquished property was acquired five years ago. The three curves in Figure 1A capture the NPV of the tax savings assuming the price of the relinquished property has increased by three percent, six percent, and nine percent, respectively, since its acquisition. One pattern is especially noteworthy: the incremental value of an exchange is positively related to the holding period of the relinquished property. Said differently, the relative attractiveness of the exchange strategy increases with the magnitude of the accumulated gain on the relinquished property. The relation between $INCNPV_t$ and π^t for a given $HOLD^t$ is also positive; that is, increased nominal price appreciation prior to the exchange produces consistent increases in $INCNPV_t$.

All else equal, the value of tax deferral relative to price increases with the expected holding period of the replacement property. However, Figures 1A-1D indicate that $INCNPV_t$ increases with $HOLD^t$, but at a decreasing rate. Overall, the benefits of tax deferral range from 0.5 percent to 10.4 percent of property value.

It is clear from Figure 1 that the incremental value of an exchange increases with the holding period of the relinquished property and the rate of price appreciation on the relinquished property. However, the value of tax deferral rarely exceeds eight percent of property value even if the replacement property is assumed to be held for over 30 years before being disposed in a fully taxable sale. This is because of two directly offsetting effects. The immediate value of tax deferral increases as the holding period of the relinquished property and/or the rate of price appreciation on the relinquished property increases. However, such increases also reduce the tax basis in the replacement property relative to what it would be with a sale-purchase strategy. This, in turn, reduces allowable depreciation deductions. This loss in the present value of future depreciation offsets the value of immediate tax deferral.¹⁸

¹⁸ As the holding period of the replacement property increases, the present value of the increased taxes due on sale associated with a fully taxable sale of the replacement property decreases. In contrast, the present value of the reduced depreciation tax savings associated with the exchange increases as the holding period of the replacement property increases. In fact, by year 34, the depreciation deductions on the replacement property would have been exhausted, if the

Our base-case assumptions can also be used to calculate the incremental internal rate of return (IRR) on the exchange strategy. Although not separately tabulated, these incremental IRRs range from 0.76 percent to 1.76 percent, with a mean of 1.14 percent, using our base-case assumptions. These seemingly low incremental IRRs result from the negative effects of “taking your old basis with you” into the replacement property, a disadvantage often overlooked in discussions of like-kind exchanges.

Exchange Benefits as a Percentage of Deferred Tax Liabilities

The initial benefit to the taxpayer and the initial cost to the Treasury of an exchange, relative to a fully-taxable sale, is the dollar amount of the deferred tax liability. However, as discussed above, the value of immediate tax deferral is significantly offset by lower depreciation deductions as a result of the basis carry-forward and larger depreciation recapture and capital gain income when the replacement property is disposed in a fully taxable sale. The true economic benefit to the exchanger is therefore equal to the deferred tax liability minus the present value of reduced depreciation deductions minus the present value of increased taxes due on the disposition of the replacement property in a fully taxable sale.

Figure 2 presents our base-case results for non-residential real property. Figure 2A displays $INCNPV_t$ as a percentage of the deferred tax liability assuming the relinquished property was placed in service five years ago. If the replacement property is sold in a fully-taxable sale two years after being acquired in an exchange and its nominal price has increased three percent annually over that two-year period, the NPV of tax savings is 9.6 percent of the deferred tax. Said differently, the present value of increased taxes after the exchange is equal to 90.4 percent (100%-9.6%) of the deferred tax liability. For holding periods greater than 26 years, $INCNPV_t$ is approximately 60 percent of the deferred tax liability. However, $INCNPV_t$ as a percentage of the deferred tax liability decreases as price appreciation over $HOLD^t$ increases. Figures 2B-2D display $INCNPV_t$ as a percentage of the deferred tax assuming $HOLD^t$ equals 10, 15, and 20 years, respectively. It is important to note that the incremental benefit of an exchange continues to vary little in response to

relinquished property had been held for five years. This reflects the remaining 34-year cost recovery period on this nonresidential property in the year of the exchange (39-5), minus the 34 years of depreciation subsequent to the exchange.

changes in $HOLD^1$ and π^1 . However, $INCNPV_t$ does increase with $HOLD^2$, although at a decreasing rate.

Overall, the results displayed in Figures 2A-2D allow us to put into context the magnitude of deferred taxes associated with real estate like-kind exchanges. First, the incremental benefit of an exchange to taxpayers, as a percentage of the investor's deferred tax liability, is largely insensitive to the length of time the relinquished property has been held by the taxpayer. $INCNPV_t$ scaled by the deferred tax liability actually decreases slightly as the amount of price appreciation realized by the relinquished property increases. However, $INCNPV_t$ as a percentage of the deferred tax liability increases as the length of time the replacement property is held before a fully taxable sale increases. Clearly, the simple application of a tax rate to the total amount of deferred gains reported on line 24 of Form 8824 dramatically overstates the benefits of exchanges to taxpayers.

From the perspective of the taxpayer, the tax deferral benefit produced by an exchange is immediate. In contrast, the foregone depreciation deductions and the increased future capital gain and depreciation tax liabilities occur in subsequent years. Thus, the present value of these future exchange costs is reduced by a higher discount rate. To examine the sensitivity of our results to higher discount rates, we repeat the analysis using an eight percent discount rate in place of the six percent base-case rate. The use of a higher discount rate increases the maximum benefits of an exchange strategy from approximately 60 percent to 70 percent of the deferred tax liability. In contrast, a discount rate less than six percent reduces the incremental NPV of an exchange to the taxpayer.

Residential versus Nonresidential Real Property

Residential real estate, including large apartment complexes and small rental properties, may be depreciated on a straight-line basis over 27.5 years rather than 39 years. All else equal, this more rapid depreciation increases the amount of depreciation recapture income subject to tax at sale and thereby increases the immediate benefit of tax deferral from an exchange. However, this increased depreciation benefit is significantly offset by the decreased tax depreciation associated with the carry-forward of basis and depreciation deductions into the replacement property. We conduct the analysis for residential real property with the same set of tax rate assumptions used for nonresidential property. The results are very similar to those reported for commercial real estate and therefore we do not report them for brevity.

4. Behavioral Effects of 1031 Exchanges – Some Empirical Evidence

The analyses in the previous sections concludes that the cost to the Treasury of the 1031 exchange program in real estate is small relative to the magnitude of deferred gains and tax liabilities. In this section, we use two property-level transaction and total return databases to examine the impact of tax-deferral on investment, leverage and liquidity.

Sample Description

Data on real estate sale-purchase transactions is obtained from CoStar COMPS, which provides historical information on CRE transactions in over 878 core based statistical areas (CBSAs) dating back to 1989.¹⁹ To assure reliability of the data, CoStar requires agents to physically inspect the site and record and verify a variety of property characteristics and transaction details. The *CoStar COMPS* database includes historical information on 1,609,711 confirmed CRE transactions from 1997 through 2014.

CoStar COMPS has a separate attribute field that indicates whether the buyer, seller, or both are using the property to initiate or finalize a Section 1031 real estate like-kind exchange. *CoStar COMPS* also contains descriptive information on the type of exchange (e.g. taxpayer's sale of relinquished property, simultaneous exchange, reverse exchange, etc.) in detailed notes. Based on text searches of these notes, each property sale involving an exchange is placed into one of the following categories: Seller's relinquished property in delayed exchange (down leg); Buyer's replacement property in delayed exchange (up leg); Both seller's relinquished and buyer's replacement property in delayed exchange.

Impact of Like-kind Exchanges on Investment

To completely avoid a recognized gain on disposition, a taxpayer using a 1031 exchange has the incentive to fully invest the cash proceeds from the sale of the relinquished property to acquire the replacement property(s). This full investment of disposition proceeds can be accomplished by

¹⁹ A Core Based Statistical Area (CBSA) is a U.S. geographic area defined by the Office of Management and Budget (OMB) that centers on an urban center of at least 10,000 people and adjacent areas that are socioeconomically tied to the urban center by commuting. Areas defined on the basis of these standards applied to Census 2000 data were announced by OMB in June 2003. As of 2012, OMB has defined 917 CBSAs for the U.S. The OMB defines a Core Based Statistical Area as one or more adjacent counties or county equivalents that have at least one urban core area of at least 10,000 population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.

acquiring replacement property that is equal to or greater in value than the relinquished property. Since CoStar provides data on seller and buyer identities and the type of exchange, we are able to match replacement property exchange transactions to the original relinquished property by searching for the acquisition of a replacement property within 180 days of the sale date of the relinquished property. This matching allows us to determine the average difference in price between the relinquished and replacement properties as well as identify cases where the exchange is likely associated with immediate tax liability because the replacement property(s) is less expensive than the relinquished property.

Panel A of Table 1 presents price statistics for investors in both like-kind exchanges as well as investors who completed a fully taxable sale followed by an acquisition within 180 days. To eliminate the effect of outliers, we trimmed and winsorized price differences at the 5% level in both tails of the distribution.²⁰ We also use a modified 1-step Huber estimation approach to remove the effect of outliers.

On average, investors completing an exchange acquire a replacement property that is \$305,000 to \$422,212 more expensive than their relinquished property. In contrast, when a fully taxable sale is followed by a purchase of a replacement property within 180 days the price of the replacement property is typically less than the price of the sold property. The t-test statistics for the differences in means between the two samples indicate these price differences are statistically significant. The difference in incremental investment under an exchange vs. under an ordinary sale and acquisition is \$305,000 to \$547,294 per transaction, and multiplied by the average number of exchanges per year in our sample (4,506) yields an average increased investment from exchanges of \$1.4–\$2.5 billion. This increase in investment, although likely underestimated, is similar in magnitude to the \$2.7 billion static estimate of the annual cost of the program.

Panel B of Table 1 presents the corresponding statistics for only those cases where the replacement property is more expensive than the relinquished property. This difference is generally larger for like-kind exchanges than for fully taxable sale-purchases. The median differences in

²⁰ Trimming eliminates observations from both tails of the distribution, while winsorizing sets the values of all observations lower than the 5th percentile value (higher than the 95th percentile value) to that value.

relinquished and replacement prices are \$792,500 and \$605,000 for like-kind exchanges and fully taxable sale-purchases, respectively.

The results in panel B are weaker than those reported in Panel A and suggest that trimming and winsorization at 5 percent do not fully eliminate the effect of outliers. However, the modified 1-step Huber estimation approach yields statistics that are consistent with the reported median price differences. Price differences for exchange transactions and fully taxable sale-purchases are \$790,597 and \$617,323, respectively. These differences in the two samples are statistically and economically significant. Finally, Panel C presents the results for transaction pairs when the replacement property is less expensive than the relinquished property. Consistent with the results in the previous panels, like-kind exchanges are associated with smaller reductions in investment in replacement properties.

Table 1 presents strong evidence that like-kind exchanges are associated with larger investments in replacement properties. However, these results could be driven in part by differences in the values of properties involved in like-kind exchanges and fully taxable sale-purchases. To address this concern we examine price differences expressed as a percentage of the sale price of the relinquished property. Although not separately tabulated, these results provide evidence that the increased investment we observe in exchanges is not driven by higher prices in our sample of exchange properties.

Table 2 examines the price difference, $P_{\text{replacement}} - P_{\text{relinquished}}$, by years. We report median price differences to eliminate any effect of outliers. We note that the price difference is larger for like-kind exchanges in all years except 2007. Generally, the difference is smaller during years of price declines or stagnant markets and larger during years of increasing real estate prices. In contrast, the price difference for fully taxable sale-purchase transactions is small each year and often negative. Although not separately tabulated, results in which annual price differences are expressed as a percentage of the price of the relinquished property are consistent with those reported in Table 2.

In Table 4 we present price difference by state. Panel A reports the results in dollars, while panel B presents the results as a percentage of the relinquished property value. We only include states for which we have a sufficient number of observations of like-kind exchanges dispositions followed by acquisitions of replacement properties. Overall, the results are consistent with our previous findings. Price differences for like-kind exchanges are positive for all states except Arizona; however, this difference is small and frequently negative in all states for fully taxable transactions.

In summary, the results reported in Tables 1 through 4 suggest that replacement properties in exchange transactions are associated with a larger investment. In addition, our analysis shows that in the majority of exchange transactions the replacement property has a higher price than the relinquished property. However, in over 30 percent of the cases the price of the replacement property is lower, which means that not all of the realized gain is being deferred.

Impact of Like-kind Exchanges on Leverage

Since the receipt of cash from an exchange transaction results in immediate tax liability, the exchange buyer in a replacement acquisition is more likely, holding investment size fixed, to make a larger down payment compared to a non-exchange-motivated buyer. We use CoStar transaction data to determine differences in acquisition leverage between properties purchased to complete an exchange and fully taxable sale-acquisitions. Leverage information is available on 719,906 acquisitions, of which 30,320 are replacement exchanges.²¹ We analyze leverage decisions for investors in replacement exchanges versus fully taxable sale-acquisitions based on a one-on-one propensity score model matching.²² The predictive model used for matching like-kind exchanges with ordinary sales is presented in Table 5. We control for size, age, age squared, parking ratio, number of parking spaces, vacancy rate, number of floors, location, timing and property type fixed effects. The results show that most of these variables significantly predict the type of the sale (replacement exchange vs. fully taxable purchase-sale).

Table 6 shows the initial leverage (at acquisition), defined as total mortgage debt divided by the purchase price, for a sample of both replacement exchanges and ordinary acquisitions. Panel A displays leverage statistics for an unbalanced panel of replacement exchanges and fully taxable sale-

²¹ Out of the original sample of 1,609,711 observations, leverage is available for 793,988 acquisitions. In 74,082 of the case leverage is either negative or larger than one. We drop these observations from the sample to avoid any bias due to outliers. This yields a sample of 809,691 observations of which 30,320 are replacement exchanges.

²² Propensity score models address the issue of selection bias in the treatment group, rather than matching on a limited number of treatment group characteristics, by matching treated and untreated observations on the estimated probability of being treated (their propensity score). The propensity score is based on a discrete choice model, which controls for a number of variables that have a relationship to the treatment decision. If use of like-kind exchanges is random, there is no need for using a matching approach. However, our analyses suggest that exchanges are more likely to be used when prices are high and the property is located in a high-tax state. Furthermore, investors are more likely to dispose of a property in a like-kind exchange when its capital gain is higher (both in dollar and percentage terms). So, it is likely that properties that are disposed in 1031 exchanges are larger and due to the regulation faced by the exchangers, subsequent 1031 exchange replacement properties are also larger. To account for this selection issue we employ a propensity score matching approach.

acquisitions, while Panel B presents the results for a matched sample based on the model described in Table 6. The first two rows in each panel report leverage statistics for samples which contain all sales, including transactions with CoStar defined sale conditions (e.g. deferred maintenance, portfolio acquisition, sale-leaseback, distress sale, etc.). In rows 3 and 4 of each panel we report leverage statistics which exclude such conditions since they may be causing differences in leverage.²³

We observe that like-kind exchanges in the unbalanced sample are associated with median acquisition leverage of 61-62 percent; for the fully taxable sale-acquisitions, initial leverage is 64-66 percent. This difference in leverage is not statistically significant. We also observe lower leverage for replacement properties in exchanges in the matched sample (Panel B). The difference in initial leverage between replacement exchanges and fully taxable sale-acquisitions is approximately 6 percent, which is statistically and economically significant.

Table 7 shows the by-year difference in initial leverage for replacement exchanges and non-exchanges for the matched sample that excludes transactions with sale conditions. The differences are negative in all years and vary between -12.3 and -2.6 percent. Similarly, the state-level results for the matched sample (excluding sales conditions) reported in Table 8 show negative differences in all states except Arizona, Maryland and North Carolina. Overall, these results strongly suggest that like-kind exchange acquisitions are associated with acquisitions of more expensive properties; however, these properties tend to be purchased with less leverage. Lower leverage reduces both investor and system-wide risk.

Impact of Like-kind Exchanges on Capital Expenditures

We next examine whether real estate like-kind exchanges are also associated with higher capital expenditures during the holding period of the replacement property. The potential effect on capital expenditures is indirect. To the extent less leverage is used to acquire replacement properties in like-kind exchanges, tax-motivated investors will have higher debt capacity to invest in building improvements.

We use National Council of Real Estate Investment Fiduciaries' (NCREIF) capital expenditure data at the property level. NCREIF produces quarterly indices that track real estate

²³ The leverage sample, excluding conditions, contains 522,574 non-exchanges and 24,365 replacement exchanges.

return performance, based on data provided by NCREIF's contributing members. In addition, NCREIF collects data on property level operating income and expenses. Detailed income and expense data are available on a quarterly basis from 2000. By matching CoStar and NCREIF data we obtain detailed capital expenditure data for a sample of exchange and non-exchange properties. Our analysis is based on the 2000-2013 period.²⁴ We conduct further statistical analysis to determine whether, all else equal, properties acquired to complete an exchange are associated with higher subsequent capital expenditures. The comparison group is a subset of properties acquired in fully taxable sale-purchase.

In Panel A of Table 9, we report annualized total capital expenditures, tenant improvements, building improvements, building expansion and other capital expenditures (including intangible improvements to the property, such as free rent and buy-outs) for an unbalanced sample of replacement property exchanges and ordinary acquisitions. In Panel B we report the annualized capital expenditures and capital components for a matched sample of replacement exchanges and ordinary acquisitions. All capital expenditures are scaled by the square footage of the property. The results suggest that, overall, like-kind exchanges are associated with higher capital expenditures, with the effect being driven by increased investment in building improvements and other capital expenditures. The differences between capital expenditures, building improvements and other expenses are only marginally significant.²⁵ However, the difference between total capital expenditures for replacement exchanges and ordinary acquisitions represents 22.5 percent of the annual capital expenditures investment in ordinary acquisitions. This is a significant increase in economic terms and could lend support to the observation of Ling and Petrova (2008) that acquisition prices of properties acquired through like-kind exchanges are higher. If capital expenditures lead to higher investment returns through increases in rents and therefore prices (Petrova and Ghosh, 2016), we can expect exchange properties will have higher prices at disposition, all else equal.

²⁴ Capital expenditure analysis is based only on selected markets, due to data availability. These markets include: Atlanta, Boston, Chicago, Washington D.C., Dallas, Denver, Detroit, Miami, Oakland, Phoenix, San Diego, Seattle, Tampa, Tucson, Washington, Los Angeles, NYC and San Francisco. The final sample contains 3502 observations, of which 99 are exchanges.

²⁵ This is likely due to the small sample size.

Impact of Like-kind Exchanges on Holding Periods

To examine the liquidity effect on existing property owners that repeal of tax-deferred exchanges would create, we compare the holding periods of properties acquired and disposed in fully taxable sale-purchases to the holding periods of properties disposed in like-kind exchanges.²⁶ The optimal holding period of real estate depends on market liquidity, expected risk and return, and transaction costs (Chen et al., 2010). Multiple studies analyze optimal holding periods in commercial real estate and find that they are between 5-8 years, depending on the conditions discussed above (see for example Chen et al., 2010). Based on anecdotal evidence we contend that tax-deferred exchanges are associated with shorter holding periods and increased liquidity for investors. We turn to CoStar data to examine differences in holding periods between exchange-motivated transactions and non-exchanges. Our results are presented in Table 10.

Our CoStar data permits us to examine properties that were both acquired and sold during the sample period, 1997-2014. This limits our analysis to a sample of “repeat sales.” This sample includes 336,572 properties, of which 8,218 (2.4 percent) are sales of relinquished properties in an exchange. Note that four percent of the properties in our dataset that were sold prior to 2014 were acquired as part of an exchange. However, only 12 percent of these represent a replacement exchange property, sold through another exchange. That is, 88 percent of the properties acquired through a like-kind exchange are disposed through an ordinary sale. This indicates investors rarely roll over exchanges into a subsequent replacement property in order to continue to defer the gain not taxed on the sale of the relinquished property.

Due to the requirement that a property must have sold twice during our sample period to be included in the holding period analysis, the calculated holding periods will tend to be shorter than what is typically observed. Indeed, the average holding periods reported in Panel B (for the full sample of repeat sales) and Panel C (for a matched sample of repeat sales) vary between 3.4 and 4 years. For comparison purposes we also calculate the average holding period including properties that have not sold a second time prior to year-end 2014. For such properties the holding period is calculated as the difference in years between December 31, 2014 and the property’s acquisition date. Note that even this assumption biases downward the average holding period.

²⁶ Properties disposed in like-kind exchanges may have been acquired either in an ordinary acquisition or an exchange.

Panel A of Table 10 shows that the average holding period of all acquisitions in the sample is 6.6 years. This is within the range of optimal holding periods reported in the literature. Overall, the results in Table 11 show that exchanges are associated with holding periods that are about half a year (Panel B) to a third of a year (Panel C) shorter. These differences are statistically significant.

Table 11 presents holding period summary statistics for each state with a sufficient number of exchanges (30 or more). We note that, in most states, exchange holding periods are shorter than for properties disposed through fully taxable sales. Taken together, the results presented in Tables 10 and 11 suggest that exchanges are consistently associated with shorter holding periods.

5. Conclusion

We analyze the impact of tax incentives on investment, liquidity, and Treasury revenues by studying the economics of tax-deferred real estate exchanges. Section 1031 of the Internal Revenue Code permits taxpayers to defer the recognition of taxable gains on the disposition of business-use or investment assets. Despite widespread use, especially in states with high state income tax rates, the President's recent budgets and tax reform proposals from Congressional tax-writing committees would eliminate or curtail this deferral option on asset dispositions.

We first develop a "micro" model that quantifies the present value of an exchange to the property owner. In addition to capturing the benefit of immediate tax deferral, the model incorporates the corresponding tax disadvantages of an exchange from the investor's perspective; in particular, reduced depreciation deductions in the replacement property and increased capital gain and depreciation recapture taxes at sale. We estimate that the incremental value of a commercial property exchange as a percentage of the investor's deferred tax liability ranges from 10 percent to 62 percent, depending on the holding period of the relinquished property, the amount of price appreciation experienced by the relinquished property prior to the exchange, and the amount of time the investor expects to hold the replacement property before disposition in a fully taxable sale.

We also employ property level data from Costar and the National Association of Real Estate Investment Fiduciaries (NCREIF) to examine the effects of like-kind exchanges on investor behavior. Our empirical analyses demonstrate that like-kind exchanges are associated with increased investment. This increased investment in replacement properties is robust over time and by state, although it tends to be larger in markets that are performing well and in states with higher tax rates. Capital expenditures (specifically building improvements) for replacement properties

purchased to complete an exchange tend to be higher than capital expenditures on non-exchange related acquisitions. Furthermore, investors executing like-kind exchanges tend to use less leverage to acquire replacement properties than investors involved in ordinary acquisitions. Holding periods for properties acquired with the use of an exchange tend to be shorter, suggesting the availability of an exchange option increases the liquidity of real estate investments.

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Figure 1: Incremental NPV of exchange as a percentage of property value

Assumptions: price of relinquished and replacement nonresidential property are equal; selling cost of a fully taxable sale and exchange costs are three percent of the relinquished property’s sale price; ordinary income tax rate: 39.6 percent; depreciation recapture tax rate: 25 percent; capital gain tax rate: 20 percent; after-tax discount rate: 6 percent; non-depreciable land portion of the relinquished property’s and replacement property’s original tax basis: 20 percent (no personal property); The incremental NPV of the exchange, $INCNPV_t$, is calculated per equation (4); π is the amount of annual price appreciation experienced by the relinquished property since its acquisition.

Figure 1A: 5 years since acquisition of relinquished property

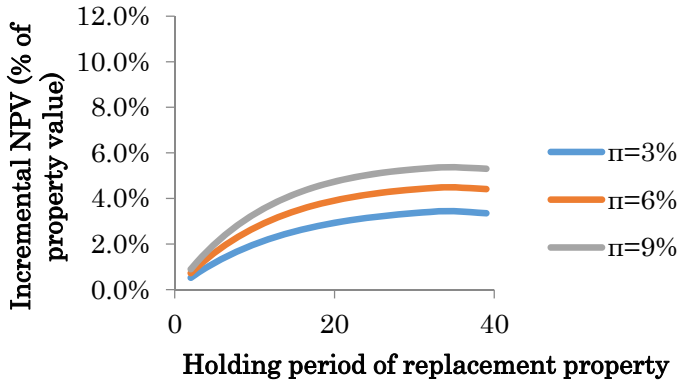


Figure 1B: 10 years since acquisition of relinquished property

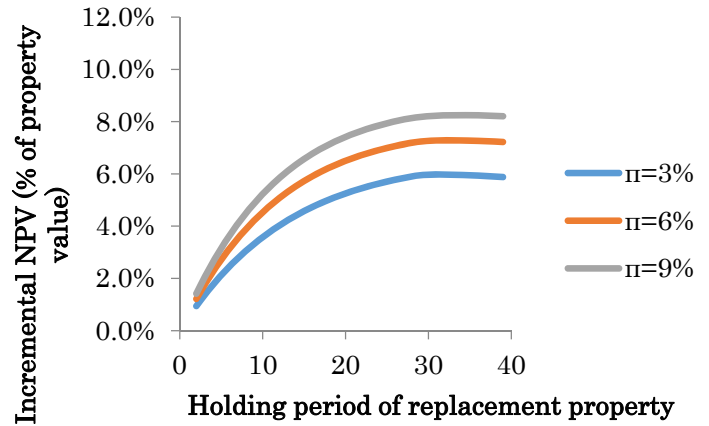


Figure 1C: 15 years since acquisition of relinquished property

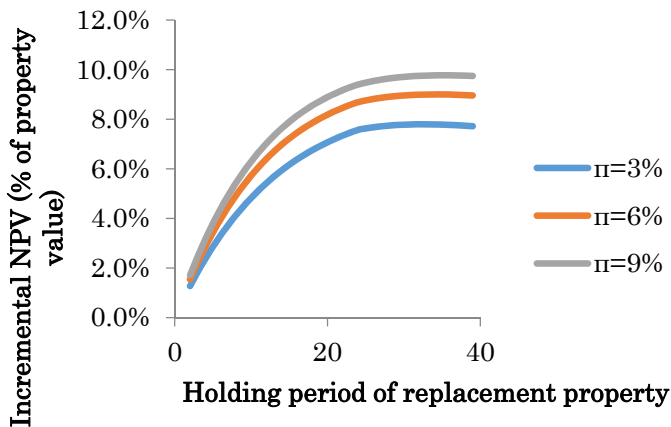


Figure 1D: 20 years since acquisition of relinquished property

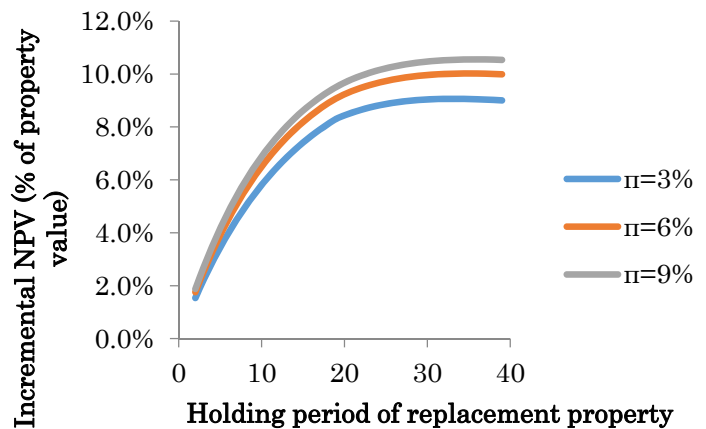


Figure 2: Incremental NPV of exchange as a percentage of deferred taxes

Assumptions: price of relinquished and replacement nonresidential property are equal; selling cost of a fully taxable sale and exchange costs are three percent of the relinquished property's sale price; ordinary income tax rate: 39.6 percent; depreciation recapture tax rate: 25 percent; capital gain tax rate: 20 percent; after-tax discount rate: 6 percent; non-depreciable land portion of the relinquished property's and replacement property's original tax basis: 20 percent (no personal property); The incremental NPV of the exchange, $INCNPV_t$, is calculated per equation (4); r is the amount of annual price appreciation experienced by the relinquished property since its acquisition.

Figure 2A: 5 years since acquisition of relinquished property

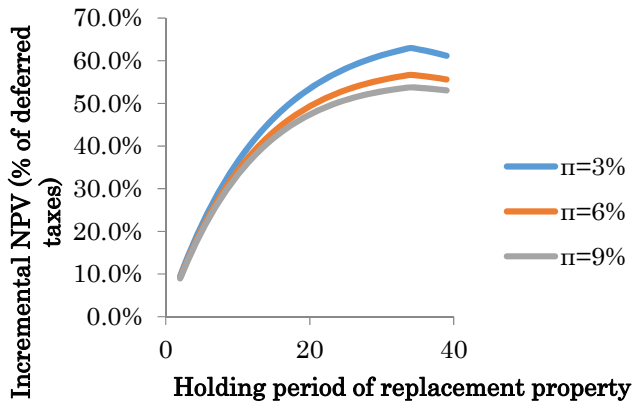


Figure 2B: 10 years since acquisition of relinquished property

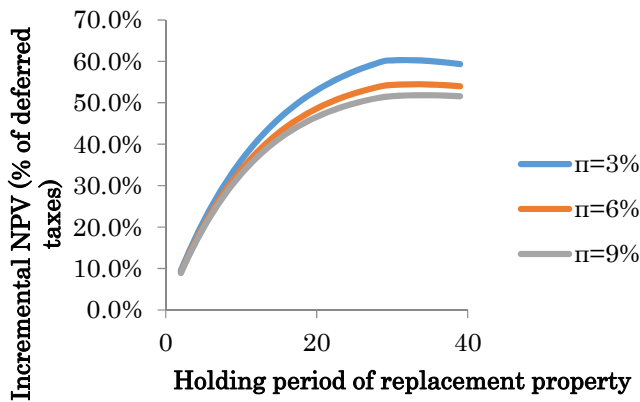


Figure 2C: 15 years since acquisition of relinquished property

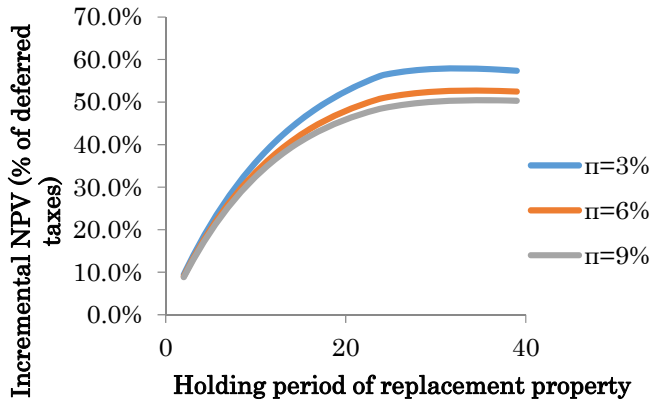


Figure 2D: 20 years since acquisition of relinquished property

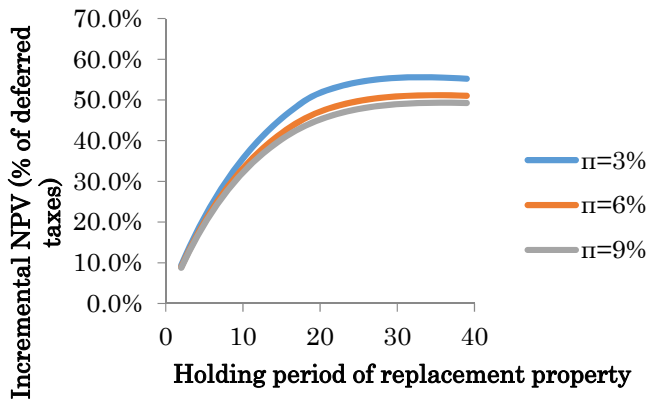


Table 1: Summary statistics for differences between relinquished and replacement property prices for like-kind exchanges vs. ordinary sales

This table presents summary statistics for differences in replacement and relinquished property prices by the same investor when the replacement property acquisition is completed within 180 days of the closing on the relinquished property and there are no other sales conditions. Price differences are expressed in dollars. Panel A presents the statistics by investors in real estate like-kind exchanges and investors in non-exchange related transactions. Panel B presents the statistics when the replacement property is more expensive than the relinquished property. Panel C presents the results when the replacement property is less expensive. To eliminate the effect of large price differences we also trimmed and winsorized price differences at the 5% level in both tails of the distribution. We also report the statistics for a modified 1-step Huber estimation approach, which also removes the effect of outliers. The price difference between the replacement and relinquished property price is positive 66 percent of the time in like-kind exchanges and 51 percent of the time in ordinary sales.

Panel A: Difference in replacement and relinquished property price in all round-trip (sale followed by an acquisition) transactions

Price Difference	Like-kind exchanges		Ordinary sales			
	Estimate	Std. dev.	Estimate	Std. dev.	Difference	Significance
Median	\$305,000		\$0		\$305,000	
Trimmed	411,974	1,160,833	(77,641)	1,342,274	489,615	***
Winsorized	422,212	1,521,802	(125,082)	1,860,107	547,294	***
Modified 1-step	349,830	867,190	22,893	839,540	326,937	***

Panel B: Difference in replacement and relinquished property price when $P_{\text{replacement}} - P_{\text{relinquished}} > 0$

Price Difference	Like-kind exchanges		Ordinary sales			
	Estimate	Std. dev.	Estimate	Std. dev.	Difference	Significance
Median	\$792,500		\$605,000		\$187,500	
Trimmed	1,110,816	1,029,177	1,070,075	1,226,849	40,741	
Winsorized	1,237,791	1,284,321	1,288,063	1,682,284	(50,273)	
Modified 1-step	790,597	652,735	617,323	577,176	173,274	***

Panel C: Difference in replacement and relinquished property price when $P_{\text{replacement}} - P_{\text{relinquished}} < 0$

Price Difference	Like-kind exchanges		Ordinary sales			
	Estimate	Std. dev.	Estimate	Std. dev.	Difference	Significance
Median	(\$722,067)		(\$735,000)		\$12,933	
Trimmed	(1,173,417)	1,297,199	(1,388,033)	1,675,901	214,616	***
Winsorized	(1,349,894)	1,627,167	(1,693,225)	2,303,570	343,331	***
Modified 1-step	(725,172)	678,380	(728,399)	686,980	3,227	

Table 2: Summary statistics for percentage differences between replacement and relinquished property prices for like-kind exchanges vs. ordinary sales by year

This table presents summary statistics by year for differences in replacement and relinquished property prices for the same investor when the replacement property acquisition is completed within 180 days of closing on the sale of the relinquished property. We report median price differences to eliminate the effect of outliers. For the full sample, the price difference is positive 66 percent of the time in like-kind exchanges and 51 percent of the time in non-tax motivated transactions.

Year	Like-kind exchanges (1)	Ordinary sales (2)	Difference (1)-(2)
	Median difference	Median difference	
1997	\$174,500	\$35,680	\$138,820
1998	510,000	-	510,000
1999	146,000	26,125	119,875
2000	240,500	13,000	227,500
2001	210,000	35,000	175,000
2002	445,000	42,611	402,389
2003	377,797	13,150	364,647
2004	430,000	100,000	330,000
2005	435,000	37,000	398,000
2006	455,000	(75,000)	530,000
2007	(117,500)	-	(117,500)
2008	100,000	(17,500)	117,500
2009	172,682	17,107	155,575
2010	330,000	-	330,000
2011	1,091,000	10,000	1,081,000
2012	78,500	-	78,500
2013	(40,000)	(56,106)	16,106
2014	977,500	(88,750)	1,066,250
Full sample	\$305,000	-	\$305,000

Table 3: Summary statistics for differences between replacement and relinquished property prices for like-kind exchanges vs. ordinary sales, expressed as a percentage of the relinquished property price, by year

This table presents summary statistics by year for differences in replacement and relinquished property prices for the same investor when the replacement property acquisition is completed within 180 days of the sale of the relinquished property. We report median price differences to eliminate any effect of outliers. The price difference between replacement and relinquished property price is positive 66 percent of the time in like-kind exchanges and 51 percent of the time in non-tax motivated transactions.

Year	Like-kind exchanges (1)	Ordinary sales (2)	Difference (1)-(2)
	% median price difference	% median price difference	
1997	20%	8%	12%
1998	63%	0%	63%
1999	27%	3%	24%
2000	44%	2%	41%
2001	26%	7%	19%
2002	43%	6%	37%
2003	39%	1%	38%
2004	38%	11%	27%
2005	40%	3%	37%
2006	24%	-5%	28%
2007	-4%	0%	-4%
2008	2%	-2%	4%
2009	10%	3%	8%
2010	15%	0%	15%
2011	76%	1%	75%
2012	-4%	0%	-4%
2013	-3%	-11%	8%
2014	60%	-12%	72%
Full sample	33%	0%	33%

Table 4: Summary statistics for differences between replacement and relinquished property prices for like-kind exchanges vs. ordinary sales by state

This table presents summary statistics by state for differences in replacement and relinquished property prices for the same investor when the replacement property acquisition is completed within 180 days of the sale of the relinquished property. We report median price differences to eliminate any effect of outliers. Panels A and B present the price differences expressed in dollars and percentage of relinquished property value, respectively. We only report data for states in which there is a sufficient number of like-kind exchanges.

Year	Panel A: Difference in prices expressed in dollars			Panel B: Difference in prices expressed in percentage of relinquished property value		
	Like-kind exchanges (1)	Ordinary sales (2)	Difference (1)-(2)	Like-kind exchanges (1)	Ordinary sales (2)	Difference (1)-(2)
Arizona	(\$146,500)	\$56,874	(\$181,500)	-15%	5%	-20%
California	350,000	75,500	267,298	34%	8%	27%
Colorado	142,500	0	215,000	8%	0%	8%
Florida	315,500	-26,700	294,900	27%	-4%	30%
Illinois	310,000	-27,500	322,300	38%	-5%	43%
Maryland	100,000	-22,330	117,892	35%	-3%	38%
Minnesota	396,000	90,000	650,110	23%	23%	0%
Nevada	131,240	-150,000	277,032	21%	-12%	33%
New York	280,000	-50,000	340,000	22%	-4%	27%
Ohio	345,000	-17,700	384,350	29%	-4%	34%
Oregon	385,625	37,829	393,125	47%	4%	43%
Texas	510,000	20,500	320,000	43%	4%	39%
Washington	349,400	11,948	334,999	44%	1%	43%
Full sample	305,000	0	305,000	33%	0%	33%

Table 5: Predictive Model Used for Matching Like-kind Exchanges with Ordinary Sales

Table 6 presents the regressions statistics for the predictive model used for one-on-one p-score matching of like-kind exchanges with similar properties, sold in ordinary sales.

Dep. Variable = Repl. Exchange	Coef.	z	
LN of Square Feet	0.373	38.50	***
Age	(0.010)	(22.57)	***
Age Squared	0.000	6.16	***
Longitude	(0.046)	(72.55)	***
Latitude	0.009	5.42	***
Parking Ratio	0.042	7.33	***
Number of Parking Spaces	(0.002)	(17.88)	***
Vacancy at Sale	(0.442)	(10.47)	***
Number of Floors	0.001	0.30	
1998	0.174	3.25	***
1999	0.444	9.01	***
2000	0.576	11.96	***
2001	0.617	12.59	***
2002	0.606	12.61	***
2003	0.581	12.12	***
2004	0.432	8.92	***
2005	0.472	9.63	***
2006	0.473	9.33	***
2007	0.152	2.88	***
2008	0.006	0.10	
2009	(0.578)	(8.15)	***
2010	(1.187)	(14.38)	***
2011	(1.374)	(16.39)	***
2012	(1.580)	(17.77)	***
2013	(1.103)	(14.90)	***
2014	(0.810)	(12.65)	***
Property Type Fixed Effects		YES	
Constant	(11.115)	(79.65)	***
Pseudo R2		0.131	
LR chi2 (34)		18943.88	
Prob>chi2		0.000	

Table 6: Summary statistics for initial leverage used by investors in like-kind exchanges vs. ordinary sales

This table presents summary statistics for initial leverage used by investors to acquire a property within 180 days of the sale of another property. Leverage is defined as the initial amount of mortgage debt divided by the property's acquisition price. Statistics are presented for leverage used to acquire replacement properties in like-kind exchanges and ordinary acquisitions when there are no additional sale conditions, associated with the transaction. Panel A presents the statistics for an unbalanced panel of all transactions in the sample period; Panel B presents the statistics for a balanced panel based on one-on-one match of like-kind exchange properties with ordinary acquisitions. The matching is conducted using a propensity score approach. The regression statistics for the predictive model employed are provided in Table 6. We drop observations where leverage is negative or larger than one to eliminate the effect of data errors and outliers.

Leverage	Like-kind exchanges acquisitions		Ordinary acquisitions		Difference	Significance
	Estimate	Std. dev.	Estimate	Std. dev.		
Panel A: Unbalanced sample						
Mean (all)	49%	31%	48%	37%	0.9%	***
Median (all)	61%		64%		-3.0%	
Mean (all; no conditions)	50%	30%	50%	37%	-0.3%	
Median (all; no conditions)	62%		66%		-3.7%	
Panel B: One-on-one (like-kind exchange – sale) matched sample using propensity-score matching						
Mean (matched sales)	52%	29%	57%	31%	-5.7%	***
Median (matched sales)	63%		70%		-6.8%	***
Mean (matched sales; no conditions)	53%	29%	58%	30%	-5.6%	***
Median (matched sales; no conditions)	64%		70%		-5.8%	***

Table 7: Summary statistics by year for initial leverage used by investors to acquire replacement properties for exchanges and ordinary acquisitions

This table presents the mean leverage used by investors each year to acquire a property within 180 days of a sale of another property. We use a one-on-one match of like-kind exchange properties with ordinary acquisitions. The matching is conducted using a propensity score approach. The regression statistics for the predictive model employed are provided in Table 6. We drop observations where leverage is negative or larger than one to eliminate the effect of data errors and outliers. Leverage is defined as total initial mortgage debt divided by the property's acquisition price.

	Like-kind exchanges	Ordinary acquisitions	
Year	Mean leverage	Mean leverage	Difference
1997	54%	56%	-2.6%
1998	54%	58%	-4.1%
1999	55%	61%	-6.0%
2000	50%	57%	-6.3%
2001	53%	58%	-5.9%
2002	55%	59%	-3.2%
2003	55%	59%	-3.9%
2004	56%	60%	-4.1%
2005	53%	59%	-6.0%
2006	51%	59%	-7.6%
2007	49%	56%	-6.9%
2008	44%	56%	-12.3%
2009	40%	48%	-8.4%
2010	34%	42%	-8.7%
2011	37%	44%	-6.7%
2012	35%	44%	-9.3%
2013	38%	46%	-7.7%
2014	38%	46%	-8.0%
Full sample	53%	58%	-5.8%

Table 8: Summary statistics by state for initial leverage used by investors in like-kind exchanges vs. ordinary acquisitions

This table presents mean initial leverage used by investors to acquire a replacement (new) property within 180 days of closing on the relinquished (sold) property. We use a one-on-one match of like-kind exchange acquisitions with ordinary acquisitions conducted with a propensity-score approach. The regression statistics for the predictive model employed are provided in Table 6. We drop observations where leverage is negative or larger than one to eliminate the effect of data errors and outliers. Leverage is defined as initial mortgage debt divided by the property’s acquisition price. We only report data for states in which there is sufficient number of like-kind exchanges.

	Like-kind exchanges	Ordinary acquisitions	
Year	Mean leverage	Mean leverage	Difference
Arizona	57%	57%	0.0%
California	52%	58%	-6.1%
Colorado	53%	59%	-5.9%
Florida	51%	58%	-7.0%
Georgia	42%	54%	-12.0%
Illinois	54%	57%	-3.3%
Massachusetts	51%	56%	-4.9%
Maryland	50%	42%	8.2%
Michigan	48%	51%	-2.9%
Minnesota	51%	64%	-13.7%
Missouri	58%	72%	-13.8%
North Carolina	46%	40%	5.9%
New Jersey	51%	55%	-4.0%
Nevada	38%	45%	-7.7%
New York	27%	40%	-13.4%
Ohio	51%	58%	-6.8%
Oregon	54%	54%	-0.5%
Pennsylvania	56%	56%	-0.1%
Texas	52%	52%	-0.9%
Virginia	50%	53%	-3.0%
Washington	54%	58%	-3.9%
Wisconsin	57%	65%	-7.7%
Full sample	53%	58%	-5.8%

Table 9: Summary statistics for capital expenditures for replacement properties in exchanges and ordinary acquisitions

This table presents average capital expenditures for exchange replacement properties (during the like-kind exchange post-acquisition period) and ordinary acquisitions. In Panel A, we report annualized total capital expenditures, tenant improvements, building improvements, building expansion expenses, and other capital expenditures (including intangible improvements to the property, such as free rent and buy-outs) for the entire sample. Panel B reports the corresponding statistics for a one-on-one matched sample, where the matching is based on a propensity score model, which controls for age, age squared, square footage, number of parking spaces, number of floors, vacancy, location, time and property type. All expenditures expenses are scaled by the square footage of the property.

	Replacement exchange acquisitions		Ordinary acquisitions			
Panel A: Annualized capital expenditures per square foot (all properties)						
	Mean	Std. dev.	Mean	Std. dev.	Dif.	Significance
Capex/sf (excl. LC)	1.53	1.97	1.26	2.18	0.27	P(T>t)=0.22
Tenant improvement/sf	0.55	0.89	0.64	1.03	-0.09	
Building improvements/sf	0.57	0.80	0.39	0.78	0.18	P(T>t)=0.07
Building expansion/sf	0.002	0.016	0.004	0.046	-0.002	
Other capex/sf	0.15	0.49	0.13	0.61	0.02	
Panel B: Annualized capital expenditures per square foot (similar properties)						
Capex/sf (excl. LC)	1.78	2.15	1.38	1.34	0.40	P(T>t)=0.20
Tenant improvement/sf	0.65	0.96	0.77	0.98	-0.13	
Building improvements/sf	0.64	0.87	0.41	0.60	0.24	
Building expansion/sf	0.003	0.018	0.008	0.041	-0.004	
Other capex/sf	0.18	0.56	0.13	0.19	0.05	P(T>t)=0.11

Table 10: Summary statistics for holding periods of investors in like-kind exchanges vs. ordinary sales

This table presents summary statistics for holding periods by exchange vs. non-exchange investments. Panel A provides the statistics for all sales in the sample, eliminating all repeating observations (1,579,547). If a property is acquired during the sample period but not sold, we calculate its holding period as the difference in years between Dec. 31, 2014 and the property’s acquisition date. We are not able to break down the sample of holding periods for all sales by exchanges and non-exchanges, since we don’t know for the properties that remain in the sample in 2014, which ones will sell in a disposition exchange. Panel B presents the statistics only for properties that transacted at least twice during our sample period (336,572). Exchange disposition sales represent 2.4 percent of the sample of repeat sales. Note that properties sold in exchange disposition sales may have been purchased in an ordinary acquisition or as a part of a replacement exchange. Panel C presents the summary statistics for holding periods of investors in a one-on-one matched sample of exchange and non-exchange dispositions, based on the repeat sales sample. The propensity-score model utilized for the matching is as described in Table 6, although the coefficient estimates vary with the different samples used.

Panel A: All properties				
Holding period	Mean	Std. dev.	Min	Max
All sales	6.63	5.09	0.00	17.94
Panel B: Repeat sales				
Holding period	Mean	Std. dev.	Min	Max
All sales	3.97	3.57	0.00	17.94
Exchanges (1)	3.49	2.83	0.00	17.75
Non exchanges (2)	3.98	3.59	0.00	17.94
Difference (1)- (2)	-0.49***			
T-stat	-12.21			
Panel C: Matched sample of repeat sales				
Holding period	Mean	Std. dev.	Min	Max
All sales	3.60	2.85	0.00	17.54
Exchanges (1)	3.38	2.60	0.00	17.30
Non exchanges (2)	3.66	2.92	0.00	17.35
Difference (1)- (2)	-0.28***			
T-stat	-4.26			

Table 11: Summary statistics for holding periods in like-kind exchanges vs. ordinary sales by state

This table presents summary statistics by states for holding periods of exchange related and non-exchange related investments for our sample of matched exchange and non-exchange properties that sold twice. In exchange investments the investor disposes of a previously acquired property through a 1031 like-kind exchange. Exchange sales represent four percent of the sample of properties that sold. We only report data for states in which there is sufficient number of like-kind exchanges. The propensity-score model utilized for the matching is described in Table 6, although the coefficient estimates vary with the different samples used.

	Relinquished through a like- kind exchange (1)	Non-exchange motivated relinquished (2)	(1)-(2)
State	Holding period	Holding period	Difference
Arizona	3.81	3.60	0.21
California	3.25	3.64	-0.39
Colorado	3.66	3.58	0.09
Florida	4.27	3.19	1.08
Illinois	2.68	3.49	-0.81
Nevada	3.44	3.98	-0.53
Oregon	4.23	4.48	-0.25
Pennsylvania	3.45	3.90	-0.46
Texas	3.45	3.81	-0.36
Washington	4.22	4.35	-0.13
Full sample	3.38	3.66	-0.28

