Currency as an Economic Norm in the Israeli Housing Market

by

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ABSTRACT

How does a market shift from one currency to another? In a period of a few years, the Israeli housing market switched from dollars to shekels. After showing that using the dollar had real effects on market participants, we consider the extent to which the transition was an emergent phenomenon or was driven by exogenous shocks, the order of the transitions of various uses of money, and differences in the adherence to the norm across individuals.

I.   Introduction

This paper is about the transition from one economic norm to another. The Israeli housing

market used the US dollar nearly exclusively as a unit of deferred payment and as a measure of value

from the early 1980s until 2002. Over the next seven years, the market moved to using the local

currency, the shekel. Norms being norms, rarely do we get the chance to examine such transitions, and

rarer still at the temporal resolution and across various aspects of the same norm that is possible here.

In this paper, I consider a number of different questions. First, did using the dollar have real

effects? Second, what caused the transition? Third, what was the pattern of the transition, across uses,

markets and individuals, and do those patterns conform to our theoretical understanding of conventions

and the process of transition from one to another? Useful concepts in answering this last question

include the uniformity or localness of market participants' interactions, distance from the market and

recency of various types of market interactions.

I construct three main series that capture the incidence of the use of the shekel in various

aspects of pricing in the housing market: the determination of the transaction price, (non-)indexation of

rental contracts, survey reporting of home values by owner-occupants and monthly rental payments by

renters, and advertising of both sales and rentals. The first two correspond to money as a unit of

deferred payment (Jevons, 1875). Payment is deferred in sales in that payment is often made in

installments over several months after the contract signing day.[1] Rental contract agreements are

typically signed once a year, but payment is made in monthly installments over the year-long lease.[2]

The remaining four measurements correspond to money as a unit of value – explicitly, in the response to

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[1] Eight months in my personal experience in the early 200s. Bar Nathan et. al. (1998) claim that such was the case in the 1974-1990 period.

[2] The vast majority of leases are for a year.

the question on home value, implicitly for the remainder. Throughout the period of our main analysis, 1998 to 2011, the role of medium of exchange was filled overwhelmingly by the shekel.

Currencies are one of the classic examples of a norm, for which the need for coordination among economic agents is paramount. The theoretical literature usually points to money as a medium of exchange in this regard, but the importance of parties using the same currency is also manifest in its other uses. Advertising in a currency different from of other advertisements, and different from that used by potential partners, puts one at a disadvantage. Even thinking in one currency while others think in another is disadvantageous, to the extent that thinking is tied to how one talks to others. We don't directly measure how people think, but survey responses should capture how one thinks or talks.   In any case, the near uniformity in the use of a single currency at the beginning and at the end of the transition make clear the importance of coordination.

Table 1 shows the use of the shekel, by selected year, for each of the series, from 1999 to 2011. It also shows a breakdown of the transaction price by whether the seller was a private individual or not. There are three exceptions to the near universal use of one currency at either of these dates, all in 1999. The smaller two of the three are due to exceptional use of the shekel by a sub-population. The ten percent shekel use in owner-occupants' home valuation is due to the Arab population's estrangement from the main housing market.[3] The sixteen percent shekel use in transaction price is mostly that of new home sales by corporations; a small incidence among existing home sales is most likely an artifact of how this variable is measured. [4]

The more than fifty percent incidence in reporting monthly rental payment responses is obviously more pervasive. This is explained by the use of the shekel throughout our period as the

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[3] Arab households constitute about one-fifth of all households in Israel.

[4] As explained in the appendix, the transaction series is measured as the fraction of shekel denominated prices that are divisible by a thousand. The less than 100 percent measure at the end of the period is similar to the fraction of Canadian dollar transactions and DKK transactions for Toronto and Copenhagen, respectively.

medium of exchange, coupled with the importance of recency in using the currency: renters

overwhelmingly pay, in shekels, for their housing services monthly. In contrast, owners, who also pay in

shekels, have either paid some time ago, or, if they have monthly mortgage payments, those payments

have a complicated relationship to the home valuation.[5]

Figure 1 shows the six main series at a monthly frequency. Except for advertising, the series

begin in January 1998, when, except for reported monthly rental payments, nearly all is in dollars. Whey

they end in December 2011, except for the transaction price which we follow for an extra year, all are

nearly fully in shekels. The two classified advertisement series shown cover only a small part of the

period, as the underlying data are costly to collect; but checks at sporadic points at early and later years

showed them to be very nearly zero to the left of the series and nearly 1 to the right of them.[6]

Two points of transition points stand out in the set of series. The first is from December 2001 to

January 2002. At that date, the fraction of owner-occupied households that report a home value in

shekels jumps up from about 10 percent to above twenty percent;[7] there is a structural break in the

trend of the share of un-indexed rental contracts from zero to about 2.5 percent per year; and the

percentage of sales transactions that are conducted in shekels jumps from about 7 to 15 percent. The

second transition occurred during the period from mid-2007 to the mid-2008. Here there is an

acceleration in the growth of the share of un-indexed rental contracts, such that the share increases

from 18 to 78 percent over the course of a single year; a similarly sized acceleration in the growth of

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[5] As we will note later, Arabs have a very high owner occupant rate, so that the comparison is essentially between Jewish renters and Jewish owner-occupants.

[6] Also see Dominguez (1990).

[7] This is not an artifact of year-specific survey instruments. Aside from the lack of any relevant differences in the phrasing or the structure of questions across the 2001 and 2002 survey instruments, about half of January's respondents are questioned according to the previous year's questionnaire. We find no significant difference in the tendency to report in shekels across the two instruments for January 2002 respondents.

shekel use in sale transactions; huge growth in the movement of ads from dollars to shekels over the period of a few months; and more gentle increases in the self-reported values.

Thus, the various uses of money transit from one currency to another at different times, with the speed of transition ranked inversely to the order in which the transition begins. In particular, advertising begins its transition must later the rest, but accomplishes it much more quickly. That pattern corresponds to a greater cost of deviating from the norm the more individuals one interacts with in the course of using the norm. In a similar way, we shall see in a household level analysis of answers to the survey questions on home value and monthly rental payments that heterogeneity across individuals in adherence to the prevailing norm generally corresponds to their relative integration into the market at that point of time. Given the shekel's use as the medium of exchange in the housing market, the recency of payment for housing services also matters.

Looking across the series, we see that both the rental and sales markets share a common ordering. First individuals began to think in terms of shekels instead of dollars, as captured by their reporting in the CES survey, then they began to use shekels in determining prices and dropped the indexing, and only once about forty percent of sales and rental contracts were in shekels did they finally began to advertise in shekels. The speed of the transition of each of these variables is ranked in the opposite order: the transition of advertising is the fastest, then price determination, and finally valuation and rental payments.

This ordering is reminiscent of Ellison's (1993, 1999) evolutionary game theoretical work on the differential behavior of coordination games with multiple equilibria under uniform versus local interaction. When individuals interact uniformly with all members of the economy, movement from one norm to another is extremely rare, as it can start only with the simultaneous occurrence of a large number of mutations; however, if it does takes place, it does so extremely quickly. In contrast, under local interaction, the transition to a superior norm is much more likely, but far more gradual. In our

context, advertising can be seen as uniform interaction – ads are directed at a large number of anonymous buyers, and compete with other ads from a large number of anonymous sellers. It is thus consistent with Ellison's analysis that it takes the longest to begin its transition and is the fastest to complete it. Of course, the analogy is not perfect, given that the various aspects of the currency norm are dependent on each other.

The appropriateness of the sort of evolutionary game theory used by Ellison (1999) depends on market participants being small. That is mostly so. The vast majority of purchasers are owner-occupants, and eighty percent of buyers who already own an apartment ('investors' in the Israeli lingo) own only one apartment other than their own – with only about 300 investors owning nine or more apartments (email correspondence from Israel Tax Authority, 2016). Rental income is exempt from taxation below an amount that would generally cover income from a single apartment, so that landlords are typically small, owning a single unit only. Renters of course rent only a single unit. Builders of new homes are the exception, as some of them are large. Unfortunately, I can not distinguish between large and small builders.

As we shall see, new home builders have a special role to play in the transition. We find that the initial movement away from the dollar was driven by outside forces, one of which was specific to new home builders. Thus the transition was not wholly an emergent phenomenon. Yet there is evidence of geographical clusters of excessive shekel use, suggesting the local interaction that Ellison (1993, 1999) has argued to be a necessary condition for an emergent transition.

The next section of the paper concerns the effectiveness of the dollar in reducing the variability of real payments under the various levels of inflation experienced in Israel over the last few decades. Section III asks whether conducting transactions in dollars had any real effect on the market. The nature of the data argues for concentrating on the rental market in addressing this question. Section IV goes into the timing of the transition as a whole, whereas Section V compares the order and speed of the

transitions of the various currency uses in the housing market. Section VI considers differences across types of individuals in the use of the shekel, while Section VII is a brief conclusion. A Data Appendix follows the conclusion.

II.   Variability of Payments, Long-Run Co-integration and the Use of the Dollar

The dollarization of the Israeli housing market was a response to the high rates of inflation that Israel experienced in the past. As shown in Figure 2, Israel experienced high double digit inflation in the 1970s and hyperinflation in the early 1980s, when annual inflation rates hit triple digits. At this distance, it is difficult to precisely date the move to the dollar in all its uses. Dominguez (1990) shows 1978 and the 1979 as the first year for which prices in ads for rentals and sales are more likely to be in dollars than in Israeli currency, and that by 1981, 97 percent of rental ads with a price were in shekels. [8] If the relative pattern of transition for the various series seen in Figure 1 held in the transition from the local currency to the dollar in the earlier period, then we would expect the other series to have moved even earlier than 1978.

Clearly the dollar was used in an attempt to maintain constant real value values. We have the most direct evidence on the contract provision of rental contracts, so we focus on them. Table 2 displays the distribution of indexation and currency use in rental contracts over the 1999-2006 period. During that period, 93 percent of renters surveyed by the Israeli Central Bureau of Statistics (CBS) had contracts in which payments were fully linked to the dollar. [9] Nearly all the remainder had contracts that were denominated in shekels and not indexed.

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[8] The data come from the *Jerusalem Post*, an English language newspaper, but Dominguez (1990) writes that the ads were jointly sold with the major Hebrew language newspapers. During the period of her analysis, Israel moved from using the lira to the (old) shekel to the new shekel.

[9] In these cases, the basic rental payment in the contract may be denominated in either dollars or Israeli shekels, or both. However, the amount reported by the respondent is always in dollars. The monthly payment itself is made in

The table shows that the extremely high amount of U.S. dollar linkage (Column (2)) began to slowly decline at the very beginning of 2002, decreased sharply in 2007, and continued to decrease until such linkage essentially disappeared by 2011. Almost of that decrease was offset by a corresponding increase in shekel denominated contracts that are not linked to any index or exchange rate (Column (3)). For a few years, there were some dollar denominated contracts with a fixed exchange rate (Column (4)). These so-called frozen dollar contracts had constant shekel monthly payments, and so were fully equivalent to the nominal shekel contracts in Column (3). Their use indicates a form of dollar illusion. The fraction of shekel denominated contracts linked to the CPI (Column (1)) barely changed over the years. Market participants seem to be averse to linking to the CPI.[10]

Why index at all? There would be no need for any type of indexation under rationality, fully flexible contracting, and perfect foresight. Anticipated inflation can always be accounted for by adjusting the level of fixed nominal monthly rents. If one side is credit constrained, the timing and amounts of payment can be adjusted to accommodate that. Where indexation potentially has a role to play is in reducing the variability of real payments when inflation is unanticipated. If all rent were paid upfront, there would be no need for that either, but rent tends to be paid in equal (whether in nominal, or real terms) payments; presumably some imperfection – whether moral hazard or self-commitment problems – leads to that practise. Given the nominal rigidity of rents *across* contracts (Genesove, 2003, (Dhyne, Alvarez, Le Bihan, et al. , 2006), the potential reduction in variability applies not only to

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shekels. Where there is linkage, it is nearly always complete. (In 1/100th of one percent of the cases, a cap is placed on the exchange rate, so that shekel payments do not exceed the corresponding amount.) This stands in sharp contrast with the partial indexation typically found in indexed wage contracts typically, both in Israel (Kleinman, 1986) and elsewhere (Card, 1986).

[10] There may be among some older tenants and landlords a distrust of the CPI, given government manipulations of the timing of changes in subsidies and regulated prices in the 1950s and 1970s (Kleinman, 1986). That, however, was some thirty years ago, and given the general deregulation of the economy, there is far less, if any, opportunity for the government to manipulate the CPI in that way.

payments within a contract, but also potentially for the length of the landlord-tenant relationship. Nominal rigidity should thus increase the demand for *dollar* indexation in high inflationary environments, as it ensures that the real value of the rent is less sensitive to unanticipated inflation across contracts, and as inflation is known to be more variable when it is high.

An alternative response would have been to link rental payments to the Israeli consumer price index (CPI). This would have truly stabilized the real value of the payment. The dollar-shekel exchange rate might nonetheless have had an advantage over the CPI during hyper- and even high inflationary periods, since consumer price indices reported at monthly intervals, and with a two week lag, may not be frequent enough to serve as an adequate index for removing inflationary risk in such conditions.[11]

That advantage would have disappeared by the mid-1990s, when annual inflation was averaging about 8.6 percent, not to mention the low single digit inflation of the next decade. Yet, as noted, we see very little use of CPI-indexation in Table 2, with the fraction of rental contracts using such indexation never exceeding two percent. The failure to index to the CPI rather than the dollar may reflect a more general advantage of the dollar. It provides a (relatively) stable scale for thinking and talking. Although one could imagine a convention of quoting rents and prices in, say, 1990 shekels, the lack of a focal base year, as well as the absence of more 'natural' users of that 'currency', as there are for the dollar, makes it an unlikely convention.

The use of the dollar-shekel exchange rate in the medium inflation decade of the 1990s and the low inflationary period of the early 2000s did nothing to reduce the ex-post variability of real payments in comparison to an un-indexed contract. Figure 3 shows that already by 1990, the standard deviation of real monthly outlays over the subsequent twelve months is more or less the same for dollar-indexed

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[11] Carrillo and Emran (2012) show that published consumer price index are used in the formation of inflationary expectations. Also, it is revealing to compare the housing market to the labour market, which did – and continues to – index to the CPI.

and un-indexed contracts. (As noted in footnote 2, the vast majority of rental contracts in Israel are one year leases.)   Beginning in mid-1997 – the start of our period of analysis-, real payment is always more variable under a dollar linked contract than a shekel-nominally fixed contract. Between 1998 and 2007, the standard deviation of real payments under the former was on average three times the standard deviation under the latter. Yet it would take until 2007 for the fraction of non-linked contracts to hit the half-way mark.

Similarly, Figure 4 shows that the standard deviation of real payments over a three month horizon appropriate for the period of the installment payments for a purchase, is much greater for a dollar denominated than for a shekel denominated sales, especially since around 1998.

Co-integration analysis provides a lower frequency picture of the ability of the dollar-shekel exchange rate to mimic the inflation rate. Although the logs are cointegrated (by the Johanssen trace test), the cointegration vector is far from [1,-1], and the hypothesis that the difference in the logs of the two variables follows a unit root cannot be rejected (approximate MacKinnon p-value of 0.80).[12] Thus over the long run, using the dollar, whether by indexing to it in a rental contract, or conceptually, through maintaining a constant dollar valuation in one's appraisal, will lead to a sizeable real adjustment

Thus by the beginning of 1998, the use of the dollar was no longer a reasonable response to the prevailing levels of inflation in either the short or long run.

II.   Effects on Contractual Rent

We have seen that indexing to the dollar led to excessive volatility in real rental payments over the course of a contract, and *a fortiori* over the entire length of a tenant-landlord relationship. Did it

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[12] The estimated coefficient vector on the 1990:I-2011:12 period is [1,1.48]. Estimated separately on 199:I-2006:12 and 2007:I-2011:12, the vectors are [1,-0.53] and [1,1.01], respectively. Thus only on the earlier period is there a negative sign, and that is far from the theoretical value of -1.

also affect the level of rent determined at contract time? In principle, there might not have been any

significance to the use of the dollar. The dollar rent might have adjusted from one contract to the next

in accordance with market conditions. In this case, the dollar would have be no more than a 'veil', like

the 'veil of money' more generally. Might 'dollar illusion' nonetheless been present? Paraphrasing

Shafir, Diamond, and Tversky (1997, p. 348), I define 'dollar illusion' as "a bias in the assessment of the

real value of economic transactions, induced by a nominal [dollar] evaluation." Dollar illusion differs

from money illusion only in that individuals evaluate transactions in nominal dollars instead of the local

currency; as with nominal illusion, there is no correction for the local purchasing power of the dollar.

In the CBS rental survey (described more fully in the Data Appendix), an apartment is dropped

from the survey when a tenant moves. Furthermore, the manner in which respondents are recruited

into the survey is such that they in nearly all cases, tenants are only observed after at least a year's

tenure. Thus for most of the sample, one can only hope to document how rents evolve for continuing

tenants and not for new ones. For the former, we can investigate the relationship between the

percentage change in the U.S. dollar denominated rent of apartments and the percentage changes in

the U.S.-shekel exchange rate at contract renewal time. Under the joint null hypothesis of (a) fully

rational behaviour on the behalf of all market participants (i.e, no 'dollar illusion') and (b) no correlation

between the dollar-shekel exchange rate and fundamental real housing rents, the following relationship

holds:

$$(1) \qquad \Delta \ln RENT = \alpha - \Delta \ln exUS\_NIS + \Delta \ln CPI + \varepsilon$$

where $\Delta \ln RENT$ is the change in the log US denominated rent between the last contract and the

current, and $\Delta \ln exUS\_NIS$ is the change in the log dollar-shekel exchange rate (the number of

shekels that a dollar buys) over the same period, $\Delta \ln CPI$ is the change in the log (non-housing) Israeli

CPI index and ε is the (unobserved) change in the 'fundamental' determinants of rent, and the change refers to the year since the previous contract. Equation (1) assumes that the new rent maintains the shekel value of the rent. For example, if the US dollar rises from 4 shekels to 5 shekels, with no change in the purchasing power of the shekel, the U.S. dollar denominated rent must fall by twenty percent to maintain the same real rent. Rationality of *all* market participants is necessary, since behaviour impacted by dollar illusion of some participants will obviously affect the outside options of the rational agents*.*

Were the Israeli economy as a whole linked to the U.S. dollar, we would not expect this condition to hold, indeed, no more than in the U.S. itself. Large number of goods were priced in dollars in the 1980s (see Dominguez (1990), Djivre and Tsiddon (2001), but it is no longer so. The vast majority of non-housing consumer prices are listed in Israeli currency. The author's own experience since 1998 is that tradesmen and most professionals quote their prices in shekels, although some (e.g., consulting) contracts or rates were set in dollars until the last few years. Supporting evidence comes from various CBS surveys. At least from 2003 on, the expenditure survey instrument provides for householders to respond about expenditures in currency other than the shekel only for housing related matters and foreign travel, about income only for rental property, business/partnership and savings income, whereas the producer price indices instruments only account for the use in the dollar for lawyers and accountants; since 2008, less than five percent of those two professions quote prices in dollars. Most importantly, wage contracts are not linked to the shekel-dollar exchange rate. If they are linked at all, and most union contracts are, it is to the consumer price index.[13]

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[13] See Kleinman (1986) for an analysis of wage contract indexation in Israel up to the mid-1980s, and Shiffer (1997) for a more recent analysis. The latter reports an effective indexation of 30% of wages to the CPI in 1996, just prior to our sample. He makes no mention of indexation to the exchange rates, although he does report that 12 percent of non-equity financial assets are indexed to foreign currency (and 61% to the CPI). Sofer (2006) cites legal services, jewelry, car rentals, and party and event management. Also see Ronen

The null hypothesis' second assumption not being inherently interesting in the present context, we need to control for any correlation between the fundamental determinants of apartment rents and the dollar-shekel exchange rate. Such a correlation will arise from productivity shocks to the Israeli economy that impact both on the housing market and the exchange rate, or variation in the expected inflation rate over time. Our solution adds the change in the log currency basket to shekel exchange rate ($\Delta \ln exFOR\_NIS$) to the model, so as to[14] isolate the fluctuations in the value of the American dollar from such shocks. Essentially a trade weighted foreign exchange rate, the basket was discontinued in 2007, but I have updated it using that year's weights for the remaining years. This leads to the following equation:

$$(2) \qquad \Delta \ln RENT = \alpha + \beta \Delta \ln exUS\_NIS + \gamma \Delta \ln CPI + \delta \Delta \ln exFOR\_NIS + \varepsilon$$

where the null of rational behaviour is ($\beta = -1, \gamma = 1$). A weaker null that captures only the absence of dollar illusion and not nominal illusion is simply $\beta = -1$.

There are two alternative hypotheses of interest. One alternative, full 'dollar illusion', would have the rent unaffected by the dollar-shekel exchange rate, so that $\beta = 0$. Market participants who viewed the dollar as being stable in purchasing power would behave such that this would be the outcome.

The other alternative is for dollar illusion to operate solely through dollar nominal rigidity. Table 3 shows clear evidence of nominal rigidity, in both currencies. 73 percent of the time, when there is no change in currencies, there is no change in the reported rent. This figure is much larger than those found in the U.S. (Genesove, 2003), Germany (Dhyne, Alvarez, Le Bihan, et al. (2006), or Turkey (Aysoy

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[14]About a quarter of Israeli exports were to the EU (not the euro-zone), compared to nearly 40% to the U.S., while of Israeli imports, nearly half came from the EU, and only 12.5% from the U.S.

et al, 2014), but less than what has been found in Japan (Shimizu, Nishimura, and Watanabe, 2010). As in Genesove (2003), nominal rigidity for continuing tenants is much larger than for new tenants.

Under this second alternative, equation (3) with $\beta = -1$ represents one regime in a switching regime model, while the second regime is characterized by $\Delta \ln RENT = 0$. Were nominal dollar rigidity the only source of dollar illusion, one would expect that the coefficient on $\Delta lnexUS\_NIS$ in an OLS regression of the form in Table 4 would still be negative but of a magnitude approximately equal to the share of non-nominally rigid rents.

Finally, note that the contractual environment allows us to eliminate in the present context one explanation that has been offered for money illusion: the difficulty of the necessary mathematical calculation. Here, that explanation is not convincing. First the stakes are high – rental payments are a high fraction of renters' expenditures; the participants are likely to have given some thought to the matter, and are not standing in a store making a quick purchase decision. Second, at contract renewal time, the participants are already engaged in a mathematical calculation: they are multiplying the dollar amount of the rent by the current exchange rate to determine the payment in shekels that they are to give or receive. Division, which may be necessary to determine the current dollar equivalent of the original shekel rent (since the inverse exchange rate is not generally published), is admittedly harder than multiplication, but not if you have a calculator, and the two sides are likely to have a calculator in hand.

Table 4 presents some regression results. I restrict the analysis for apartment-tenant-contract combinations for which (a) both the current and the previous contract is linked to the dollar, and (b) there is no change in the tenant. I aggregate observations to the month, according to the starting date of the contract, by taking the mean percentage changes in all the observations whose starting date falls between the 21st day of the preceding month, and the 20th day of the month in question. Doing so

eliminates within month variation, but simplifies the autocorrelation structure. Standard errors are corrected for serial correlation.

Column (1) shows the bivariate regression of the change in the U.S. denominated log rent and the log U.S. dollar shekel exchange rate. The figures in Table 3 imply that would should expect a coefficient of about -0.25. Instead, we obtain a statistically significant coefficient of 0.06 .Column (2) adds the change in the log (non-housing) CPI, while Column (3) adds the change in the log basket-shekel exchange rate.   In all three specifications the coefficient on the change in the log dollar shekel rate is positive and significant, so that it is clear that the null hypothesis is rejected. There is substantial serial correlation, as measured by the regression of the predicted error on its lag, in the first two columns, but it is cut in more than half and becomes insignificant if either the Euro-shekel rate or the calendar time variables are included.

Table 5 provides another take on the issues. It shows the distributions, given a nonzero change in the dollar rent, of the percentage change in the rent, unadjusted, adjusted for the exchange rate, i.e., $\Delta \ln RENT + \Delta \ln exUS\_NIS$, and adjusted for both the exchange rate and the CPI, i.e., $\Delta \ln RENT + \Delta \ln exUS\_NIS - \Delta \ln CPI$. Under the full rationality assumption, and in the absence of fundamental shocks to the market rent, the adjusted rent change should be distributed tightly around zero, if market participants correct for the exchange rate, alone or for the cost of living as well. Although the median under either adjustment is near zero, it is clear that there is no "mass point" at zero, as would be the case if a substantial portion of the market adjusted for the exchange rate; indeed the distributions of the adjusted rents are more spread out than that of the rent itself.

IV. **The Transition**

I first ask whether one can explain what set off the transition. One possibility is that the transition was an emergent phenomenon. That is, it occurred without any outside impetus. In this view, there is a constant degree of randomness in adherence to the norm. In the language of evolutionary game theory, the occurrence of a sufficient number of deviations from the prevailing norm can set off a process that moves the market to a different equilibrium. Ellison (1993) has pointed out that in any reasonable size population, the expected time for a transition from one norm to another would be impossibly high if individuals interact uniformly with the population. In contrast, when interactions are local, so that the set of individuals a given agent interacts with overlaps with the sets of individuals interacting with those same individuals, transition time can be much faster.

That suggests that for evidence of the transition as an emergent phenomenon we should look for local clusters of the use of the shekel. 'Localness' can be in terms of many different dimensions of relationship, but the only one we have the opportunity to examine is the geographical. We consider local geographical emergence at both a macro and micro level. Figure 5 shows the share of sales transactions that used the shekel, by city, for six major cities. No city can be said to lead the others in the transition period.

Table 6 provides a much finer look. It presents linear probability regressions of an indicator for the use of the shekel in a sales transaction on the average use of the shekel among the remaining transactions in the same gush-helka (property lot – typically a multi-unit building) and month. The unit of observation is chosen randomly among all units in the gush-helka and month. Column (1) shows the regression on average shekel, with year dummies. 208 fixed effects for the month of transaction are included in all regressions. We see that when all other transactions are denominated in shekels, the probability that the given transaction will be thus denominated is 26 percent greater than otherwise. The interpretation is not meant to be causal, rather correlative only, merely to reflect as a way of revealing clusters of shekel-use among the transactions. A pattern of clusters, however, might be

reflective only of spatial correlation among others variables that determine the use of the shekel, irrespective of neighbours' behavior. To account for that, the regression in Column (2) adds the log of the (shekel denominated) transaction price. Given the presence of month fixed effects, the variable captures the quality of the apartment, whether in location, size and physical quality, and so should proxy for the wealth of the buyer and seller. Wealth should, in turn, be reasonably highly correlated with education. Adding in number of rooms and net area should capture family size, and given the presence of price, separate out the quality of the location. Column (5) adds fixed effects for the locality, which should go some distance to allowing for different effects of education and wealth.

The coefficient on average shekel use is strongly robust to the inclusion of these variables. It does decline with the inclusion of additional controls, all of which are highly significant, but even controlling for price, number of rooms and area, the coefficient is still ninety-four percent of its value when only that variable is included (along with the month fixed effects). Moreover, the effects of the control variables are much smaller than that of shekel use: Column (2) shows that doubling a unit's quality is associated with only a 2.36 increase in the probability that the unit's price will be denominated in shekels. We conclude that there is evidence for localness in the use of the shekel beyond that predicted by spatial correlation of other determining factors. To recall, this is a necessary condition for the transition to have aspects of an emergent phenomenon.

At the same time, the transition is clearly not fully emergent, as there are events involving plausible factors in determining preferences for using the shekel which are coincident with structural breaks in our series. These events involving movements in the exchange rate and relevant legislation. Yet not all dramatic movements in the exchange rate lead to structural changes, or at least lasting ones.

The shekel to dollar exchange rate is shown in Figure 6. Its overall movement is easy to summarize. After increasing steadily since the stabilization, it has a couple of substantial cycles, then

flattens out in 2004-2006, with some upward plateauing. There a few sharp movements, that are worthy of mention.

Notice the sharp, one month six percent depreciation of the shekel from December 2001 to January of the next year. (The shekel continued to depreciate by another nine percent over the next half year, then gained that back over the second half). The December to January jump is coincident with the first transition point of January 2002, which, to recall, involves a jump in the shekel share of owner-occupiers' home valuation and sales transaction, and an increase in trend, from zero, in the share of nominally fixed rental contracts.

Another depreciation is also mirrored by movements in the use of the shekel, although the effect is in the opposite direction. In the midst of a long appreciation of the shekel that has it start in the beginning of 2006 and ends in mid 2008, the shekel briefly depreciates by six percent from May to July 2007, and then appreciates by the same amount until October. As can be seen from Figure 1 and, in a close-up in Figure 7, the use of the shekel reverses course over this period. The sales contracts, rental ads and sales ads series all decrease during this period, partially, or, in the case of the ads, completely, undoing their previous increase, until the local exchange rate peak. They then return to their previous levels by October 2007, at which time the exchange rate has returned to the level it had prior to the short depreciation.   Rental contracts have a similar response, except it is to dramatically slow the rate of increase over the May-October period, rather than to reverse course.

Although these two depreciations are associated with opposite movements in the use of the shekel, their effects can be reconciled if we interpret them as indicators of volatility. The first depreciation takes place after a decade of mostly gradual depreciation; its sharpness could have been taken as an indicator of future volatility in the shekel-dollar exchange rate, thus making dollar-indexation less attractive. The second depreciation, which was much less sharp than the first, took place

after an eighteen month-long gradual appreciation of the shekel; it might have been seen as a correction, and thus an indicator of reduced volatility.

Yet not all structural changes are attributable to exchange rate movements and not all exchange rate movements are associated with structural changes in the shekelization process. On the one hand, there is no dramatic change in the dollar-shekel exchange rate coincident with the point(s) of acceleration in the transition. Those changes take place during a period of gradual appreciation of the shekel, which begins in 2005, a couple of years before the acceleration.[15] On the other hand, there is no jump or change in trend in shekelization that coincides with the sharp appreciation of the shekel in the first half of 2003 that mostly undoes the 2002 appreciation.

There is another dramatic change in the exchange rate that does coincide with a change in shekelization. In the second half of 1998, the shekel depreciated 15 percent over a four month period. As for the 2002 depreciation, it is associated with a jump in the use of shekels in transactions, and perhaps in owner's valuations of their homes. (Note that the rental indexation series only begins in 1999.) What distinguishes the behavior of these two series around the two dates is the aftermath of the jumps. In 2002, the shekel share remains high afterwards. In 1998, the share returns to its previous level.

Why the difference? A likely explanation is the amendment to the Consumer Protection Act introduced in mid-December 2001. This bill required firms to set and to advertise apartment prices in shekels. The bill was passed in March 2002 and came into effect in mid-June 2002. Note that only firms were subject to the law, and not private sellers. Thus the bill was relevant to the sale of new homes,

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[15] An alternative interpretation of the effect of exchange rate movements on shekelization works through the bargaining power, coupled with unsophisticated agents on the other side. This relies on the predictability of exchange rate changes.

but, as a rule, not to existing homes. For that reason, Figure 8 distinguishes between homes sold by a firm and homes sold by a private party. This lines up neatly with whether the home was built a year or two previously, or was an older home. We see that the jump in December 2001 was much larger for homes sold by firms than those sold by private individuals. Furthermore, the increase in shekel use for private sales deteriorated over the next few years, whereas that for firms remained relatively stable.

Advertising behavior shows more or less adherence to the law. Figure 9 shows the percentage of display ads for new homes that are priced in shekels, among those that advertised a price, at a quarterly frequency from 1998 to mid-2008. Figure 10 zooms into 2002 at a weekly frequency. (Classified ads for existing homes in this period were all in dollars.) The figures are based on a small number of ads each period, yet they tell a clear story. The percentage hovers around five percent in the couple of years leading up to the law. After the introduction of the law, the percentage barely changes until the law is passed, whence the percentage increases to between 20-60 percent for several weeks, until it falls back down, presumably as firms realize that the law is not yet in effect. When it does come into effect, the rate jumps to 100 percent, and stays there for a few months. After that, more ads continue to be priced in shekels than dollars, but compliance is far from perfect.

Thus although the market seems to have initially responded to the sharp depreciations in 1998 and 2001:12 similarly, only the latter had lasting effects, since only in the latter case was there legislation to lock-in the response. If the legislation was indeed the key to the differential long-run response, its effect was felt beyond the legalistic implications, since the rental market, which was not subject to the law, started its slow shrugging off of dollar indexation at that time. By this interpretation, use of the shekel in the one market (sales) would have spilled over into the other one (rentals).

V.   The Order and Speed of Transition

The order of transition to the shekel among the various uses of currency that in the early 1990s were still dominated by the dollar accords well with an ordering given by the number of people one interacts with in the use of the currency. Classified advertising in both sales and rentals began their movement to the shekel last – about five years after the rest began to move - , but it transited fasted. In this use, the agent (the ad placer) interacts with a large number of anonymous buyers; its ad is compared to the ads of a large number of anonymous sellers.

Self-reported rents is the first to begin its transition, with about half of surveyed individuals reporting in shekels already by 1998. We have noted how this can be explained by the recency of the use of the shekel as the medium of exchange and salience of the budget constraint. Yet at the same time, the act of survey response involves no market interaction, and so can be said to reflect the individual's own thinking, although that may be formed in part through social interactions. The remaining three series begin their transitions together in January 2002, set off by the large and sudden depreciation of the shekel and maintained by the passage of the Consumer Protection Act amendment. However, the increase in the home value response is much greater than the other two, and in particular, does not reverse as does the transaction price index after two years. By the start of 2007, on the eve of the second transition, the home value response shekel share is about three times that of the other two. So, here, too, we see that currency use in non-market interaction moves earlier than others.

It also takes the home value response the longest to reach near universal use of the shekel. Along with the speediness of the transition of classified advertising, this strongly suggests that co-existence of competing norms is more difficult the more individuals on the other side of the market to which one's actions are directed.

VI.   Heterogeneity in Norm Adherence: Distance from the Market

A closer look at the CES survey responses reveals chow the use of the shekel depends on individuals' connection to the market. We start with the difference between Arabs and Jews. An indicator for whether the interview was conducted in Arabic or not is available only from 2001, which fortunately precedes the first transition point. Whereas in that year less than one percent of Hebrew speaking owner-occupants reported a home value in shekels, nearly two-thirds of Arab speaking owner-occupants did. The differential behavior continues throughout the transition, and only narrows as both series converge to one.

The greater shekel response among Arabs is surprising at first. One might think that Arabs would be less likely to respond with the local currency, as they identify with the state far less than the Jews. The answer is that the housing market is much less active in the Arab sector: as Table 7 shows, whereas 1.41 (1.94) of non-Arabs report a house purchase in the previous twelve months, only 0.05 (0.17) of the Arabs do.[16] The Arab rental sector is also smaller, with 25.4 percent of non-Arabs renting, but only 7.8 percent of the Arabs. Income is lower among Arab households, yet Table 8, which shows use of the shekel in responding to the home value question by Arab sector and income decile shows clearly that income is not the reason for the differential behaviour. Whatever the reasons for this difference – a tendency of Arabs to build in the family compound, or less access to the general market because of own tastes or discrimination – this much smaller contact with the market is bound to lead to a situation in which individuals have much less of a concept of how much their home is worth. If one has to come up with some arbitrary number in answering a questionnaire, one might as well answer in the currency that, for most people, is that used in one's day to day transactions - especially after having answered about 80 previous questions with shekel values.

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[16] It is also possible that Arabs under-report, both in the survey and to the tax authorities. A recent partial tax amnesty has led to a number of registrations of decades-old transactions.

Next we turn to the currency of response to the CES rental payment question. It stands out among our six major series as already in 1998 as being about half in shekels. In addition to a survey response reflecting little interaction with others, as stressed in the previous sub-section, one can also interpret this as reflecting the importance of the frequency of the use of the medium of exchange. As opposed to a purchase, rental payment is a continual process. Even if the respondent wrote all of his cheques as post-dated cheques at contract signing time, he will be conscious of the withdrawal of the shekel amount from his bank account each month.

Distance from the market explains differences in reporting behavior among renters as well. We see this at two different levels of resolution. The first is via the distinction between tenants in their first year in the apartment and those who have been there for longer. (The survey lacks more precise duration information for those who have lived in the apartment for more than one year.) A tenant in his first year is likely to be more recently exposed to the market; the surplus in a continuing relationship that leads most tenants to continue in the same apartment past the first contract also leads many to not even visit the market. Figure 11 shows how shekel response incidence varies over calendar time for the two statuses. New tenants are more likely to respond to the CES question about their monthly payments in the currency that the market is operating in at that time: the dollar in the early years, and the shekel in the later years, with no difference between the two years in the middle period.

For tenants in their first year, the questionnaire asks for the month that they moved in, which allows us to investigate the distance from the market at a finer resolution. Table 9 shows the fraction of shekel reporting by the number of months from contract signing for those who signed a first contract within the last 12 months, controlling for the 170 calendar months. Column (1),which covers the entire period, shows that after the month of signing, the tendency to quote in shekels goes up and then falls in the months before contract renewal (assuming the lessee does not leave the rental market). Whether these tenants are likely to be re-signing with the same landlord (as about 70 percent of those remaining

in the market do) or a different landlord, in any case they will soon be returning to the market and it is not surprising to see them returning to the dollar in anticipation. This pattern is repeated in Column (2), which covers only the years prior to 2007, and so a time period when the vast majority of rental contracts were still primarily indexed to the dollars, but not in Column (3), which covers the post 2007 period, when very few contracts were indexed. Table 10 provides a more succinct representation of this pattern by replacing the number of months dummies with a linear or linear-quadratic representation. The data prefer the latter for the pre-2007 period, in line with the pattern discussed above.

We also have the opportunity to compare the currency of reporting of home values by recent purchasers and other home owners. Similarly, recent buyers are more likely to state the value of their home in shekels, than those who had purchased more than a year earlier. Two effects may be at work here: on the one hand, the more recent the purchase, the more contact with the market; on the other hand, the more recent the purchase, the stronger the memory of the amount in shekels paid.

VII.   Conclusion

The Israeli housing market moved from a near exclusive use of the dollar as a unit of value and deferred payment to a near exclusive use of the shekel in these functions. The large fall in inflation prepared the ground for the transition, but it required a large depreciation in the shekel in early 2002 to set it off and the passage of an amendment requiring advertising in new homes to maintain it. Nonetheless, the dollar continued to be the dominant currency used for these functions for about five years until, through what appears to be an emergent phenomenon, the transition accelerated in 2007-2008.

The various uses of money transited from the dollar to the shekel at different times and different speeds, in line with the extent of interaction with the market and society as a whole in each

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use. This, along with the use of the shekel as a medium of exchange over the entire period, means that at any given point of time over the transition, a single individual might be using two different currencies to represent the price of the same asset.[17] Individuals differ in their adherence to the currency home, with those having interacted with the market more recently adhering closer to the norm.

Data Appendix

Sales transaction data come from shekel denominated prices reported as part of the capital gains tax levied on residential properties. The relevant forms are input at the Tax Authority into a database called Carmen, which forms the basis of the Central Bureau of Statistics (CBS) residential housing price index. The database was obtained from the CBS. We form the series used in the paper by calculating the share of prices whose remainder term, when divided by 1000, was one of zero, 1 or 99. The database allows one to discriminate between transactions for which the seller is a firm, and those for which the seller is an individual. This variable correlates nearly perfectly with whether the property is new (year of construction less than three years from the year of transaction) or old (otherwise).

Data on rents come from the CBS' continuous apartment rent survey. This survey is a panel of respondents drawn from the Labour Force Survey, the Social Survey and the Household Expenditures Survey and yields the raw data that, since 1999, has formed the basis for the construction of both the owner-occupied and rental housing components of the Israeli CPI, which constitute over one-quarter of the overall CPI.[18] Respondents are re-interviewed at intervals meant to capture different contracts, which, in general, means on a yearly basis, (Nearly 90% report a yearly contract, with 5% reporting less

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[17] Nowhere is that clearer than in the case of one eighth of new home purchases in the CES, who when asked how much they paid for their home answered in shekels, but when asked the value of their home, answered in dollars.

[18] Previous to this date, the housing components were constructed on the basis of hedonic estimates of housing sale prices.

than a year, and 5% reporting more.) The data set reports an ID number for the apartment, indicator for change in apartment or change in tenant[19], contract starting date, contract ending date, monthly payment and currency, indexation type, street address, locality and minimal information on the apartment characteristics (number of rooms and bedrooms).

The rental survey data have two major limitations. The first is that the date of the first contract (i.e., the date on which the tenant moved in) is not known. The second is that, for the most part, surveying stops when the tenant moves apartments. There are exceptions: since the survey is done by telephone, it follows the tenant to a new apartment when the CBS has his/her cellular phone number (or land line, if the tenant owns the line and has transferred that to the new address), or stays with the same apartment if the new tenant answers the land phone and is willing to participate in the survey. Unfortunately, in most cases one does not know why the interviewing stopped: whether because the interviewee refused to continue to participate, or moved, and could not be followed.

The own home valuation and monthly rental payment indices are formed from the responses to these questions in the CBS' Consumer Expenditure Survey.

The advertising indices are based on data collected on classified ads from the Friday editions of the then leading newspaper, *Yediot Achronot*. The index is the share of ads with a shekel denominated ad amongst all ads with a price denominated in either shekels or dollars. We found essentially no ads with a price with the currency not given.

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[19] This information has only been collected since 2005, at my request.

Table 1: Use of the Shekel in Six Major Series – Selected Yearly Averages

	1999	2001	2002	2006	2007	2008	2010
Rental Market							
Monthly payments	.56	.54	.54	.58	.64	.85	.98
Non-Indexation	.02	.03	.05	.15	.33	.75	.93
Classified Ads	~0	~0	~0	~0	.11	.70	~100
Sales Market							
Home Value	.10	.09	.26	.33	.35	.54	.87
Transactions – All	.16	.13	.26	.18	.38	.84	.88
(Transactions – Private Sellers)	.07	.06	.14	.12	.33	.87	.94
(Transactions – Firm Sellers)	.35	.27	.51	.45	.59	.72	.71
Classified Ads	~0	~0	~0	~0	.05	.75	~100

Table 2: Currency and Index Method of Contract

Currency Linkage	(1) NIS CPI	(2) Dollar Dollar	(3) NIS None	(4) US None	(5) Other None	(6) SUM
==-ADD (2) and (4) together==						
Year						
1999	27	2,917	31	9	0	2,984
	0.90	97.75	1.04	0.30	0.00	100.00
2000	46	3,858	63	19	0	3,986
	1.15	96.79	1.58	0.48	0.00	100.00
2001	39	4,532	79	9	0	4,659
	0.84	97.27	1.70	0.19	0.00	100.00
2002	112	6,012	244	86	0	6,454
	1.74	93.15	3.78	1.33	0.00	100.00
2003	102	5,478	401	88	3	6,072
	1.68	90.22	6.60	1.45	0.05	100.00
2004	122	6,659	747	139	5	7,672
	1.59	86.80	9.74	1.81	0.06	100.00
2005	61	5,983	765	155	5	6,969
	0.88	85.85	10.98	2.22	0.07	100.00
2006	17	1,756	233	46	0	2,052
	0.83	85.58	11.35	2.24	0.00	100.00
Total	526	37,195	2,563	551	13	40,848
	1.29	91.06	6.27	1.35	0.03	100.00

Table 3: Nominal Rigidity

| | Dollar Linked | | | Unlinked | | |
| | Nominally Rigid? | | | Nominally Rigid? | | |
	No	Yes	Total	No	Yes	Total
Different Tenant	357	371	728	18	22	40
	49.04	50.96	100	45.00	55.00	100.00
Same Tenant	3,744	10,799	14,543	286	527	813
	25.74	74.26	100	5.18	64.82	100.00
Total	4,101	11,170	15,271	304	549	853
	26.85	73.15	100	35.64	64.36	100.00

Table 4: Symmetric Effects Only

Variable	(1)	(2)	(3)	(4)	(5)	(6)
dexchange	0.06	0.06	0.08	0.06	0.07	0.07
	(0.02)	(0.02)	(0.02)	(0.02)	(0.015)	(0.02)
dCPI		-0.1	-0.05		-0.08	-0.07
		(0.05)	(0.05)		(0.05)	(0.05)
dEXEU			-0.04			-0.01
			(0.01)			(0.02)
year				-0.02	-0.008	-0.006
				(0.002)	(0.002)	(0.004)
year2				0.002	0.002	0.002
				(0.001)	(0.001)	(0.001)
_cons	-0.002	-0.000	-0.000	0.007	0.007	(0.005
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.005)
rho	.31	.30	.14	.13	.12	.11
	(.11)	(.11)	(.11)	(.11)	(.11)	(.11)
R-squared	0.14	0.19	0.33	0.35	0.38	0.38

Dependent variable is the change in the log of the US dollar denominated rent. dexchange is the change in the log US dollar-shekel exchange rate, dCPI is the change in the log of the CPI, dEXEU is the change in the log of the Euro-shekel exchange rate, year is days since Jan 1 1999, divided by 365. all changes are from date of last contract starting date to current contract starting date. Coefficients and standard errors (in parentheses are OLS). rho is the estimated coefficient from the regression of the predicted error on its lag. Data are aggregated up to the month of the current contract starting date. There are 79 observations, from January 2000 to July 2006.

Table 5: Distribution of Nonzero Percentage Rent Changes

	(1) Unadjusted	(2) Adjusted (Ex. Rate)	(3) Adjusted (Ex. Rate – CPI)
10	-.140	-.160	-.182
20	-.090	-.101	-.121
30	-.063	-.064	-.080
40	-.043	-.029	-.046
median	-.021	.005	-.012
60	.027	.041	.021
70	.051	.072	.055
80	.080	.108	.093
90	.134	.180	.159

Table 6: Local Clusters of Shekel Use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction Shekel	0.260	0.254	0.253	0.245	0.232	0.227	0.253	0.227
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
ln(Price)		0.034	0.031	0.026		0.041	0.069	0.043
		(0.002)	(0.002)	(0.002)		(0.002)	(0.007)	(0.009)
ln(Price)^2/10							-0.016	-0.001
							(0.003)	(0.003)
ln(Number of Rooms)			0.021	0.033				
			(0.005)	(0.006)				
Ln(Net Area)				-0.013				
				(0.003)				
Locality FE					YES	YES		YES
Pre-2006								
# of Obs.	48,477	48,477	48,477	41,604	48,477	48,477	48,477	48,477

All regressions include locality fixed effects.

Table 7

Language	Percent Renter	Percent Sold Apt.	Percent Purchased Apt
Non-Arabic	25.37	1.41	1.94
	[59,381]	[59,381]	[59,381]
Arabic	7.83	0.05	0.17
	[8,147]	[8,147]	[8,147]

Source: CES, 2001-2011. Percent Purchased is for owner-occupied.

Table 8

Household Expenditure Decile	All	Non-Arabic	Arabic
1	0.07	0.004	0.75
2	0.10	0.000	0.71
3	0.13	0.007	0.71
4	0.13	0.007	0.67
5	0.12	0.003	0.66
6	0.10	0.003	0.63
7	0.09	0.003	0.52
8	0.08	0.010	0.62
9	0.09	0.010	0.69
10	0.050	0.009	0.52
Total	0.094	0.006	0.64

Source: CES, 2001-2011. The table reports the fraction of respondents reporting home values in shekels, among all home owners. Household expenditure decile is the overall household income decile to which the household income belongs.

Table 9

	(1)	(2)	(3)
Months Since Contract:			
1	0.036	0.046	-0.038
	(0.030)	(0.034)	(0.023)
2	0.009	0.021	-0.025
	(0.028)	(0.033)	(0.021)
3	0.043	0.038	-0.018
	(0.028)	(0.032)	(0.20)
4	0.058	0.072	-0.030
	(0.029)	(0.034)	(0.021)
5	0.016	-0.000	-0.029
	(0.028)	(0.034)	(0.021)
6	0.041	0.058	-0.029
	(0.029)	(0.035)	(0.024)
7	0.032	0.045	-0.041
	(0.029)	(0.034)	(0.020)
8	0.056	0.085	-0.043
	(0.030)	(0.036)	(0.024)
9	-0.029	-0.021	-0.078
	(0.031)	(0.037)	(0.031)
10	-0.030	-0.040	-0.031
	(0.031)	(0.037)	(0.025)
11	-0.036	-0.051	-0.037
	(0.034)	(0.040)	(0.029)
12	-0.028	-0.018	-0.057
	(0.035)	(0.044)	(0.032)
F-test p-value	0.006	0.009	0.547
Number of Month Fixed Effects	170	120	38
Number of observations	6204	4599	1197

Source: CES, 2001-2011. Dependent variable is a dummy equal to one if the rental contract is unindexed to the dollar. F-test p-value is for the joint test that the twelve month dummies have zero coefficients. The omitted month dummy is zero, for the case in which the respondent reports that the contract was signed in the same month of the interview.

Table 10

	(1)	(2)	(3)	(4)	(5)	(6)
Months Since Contract	-0.0041	0.0146	-0.004	0.0174	-0.003	-0.0027
	(0.0017)	(0.006)	(0.002)	(0.0072)	(0.002)	(0.0062)
Months Since Contract -squared		-0.0016		-0.0019		-0.00002
		(0.0005)		(0.0006)		(0.0005)
F-test p-value		0.0003		0.0003		0.25
Number of Month Fixed Effects	170	170	120	120	38	38
Number of observations	6204	6204	4599	4599	1197	1197

Dependent variable is a dummy equal to one if the rental contract is unindexed to the dollar. F-test p-value is for the joint test that the coefficients on both 'Months Since Contract' (was signed) and 'Months Since Contract – signed' are zero.

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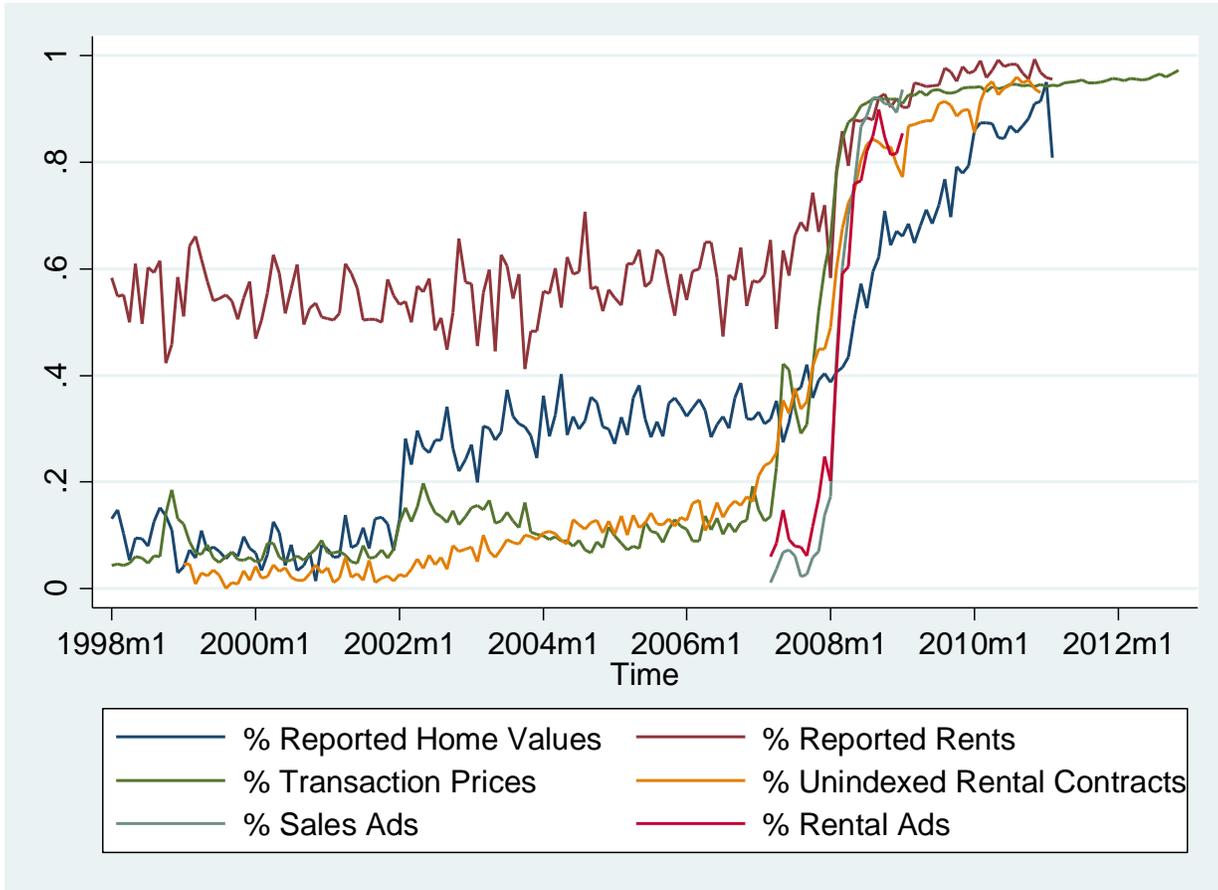
Figure 1: Six Major Series of Incidence of NIS use: CES Reported Home Values and Monthly Rental Payments, Transaction Prices, Unindexed Rental Contracts, Sales and Rental Classified Advertisements
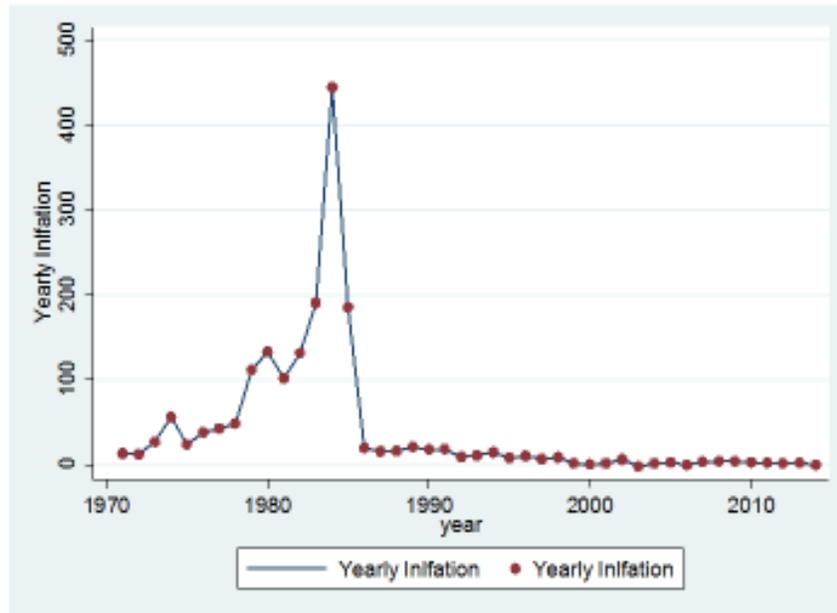
Figure 2: Inflation Rate in Israel: 1970-2014
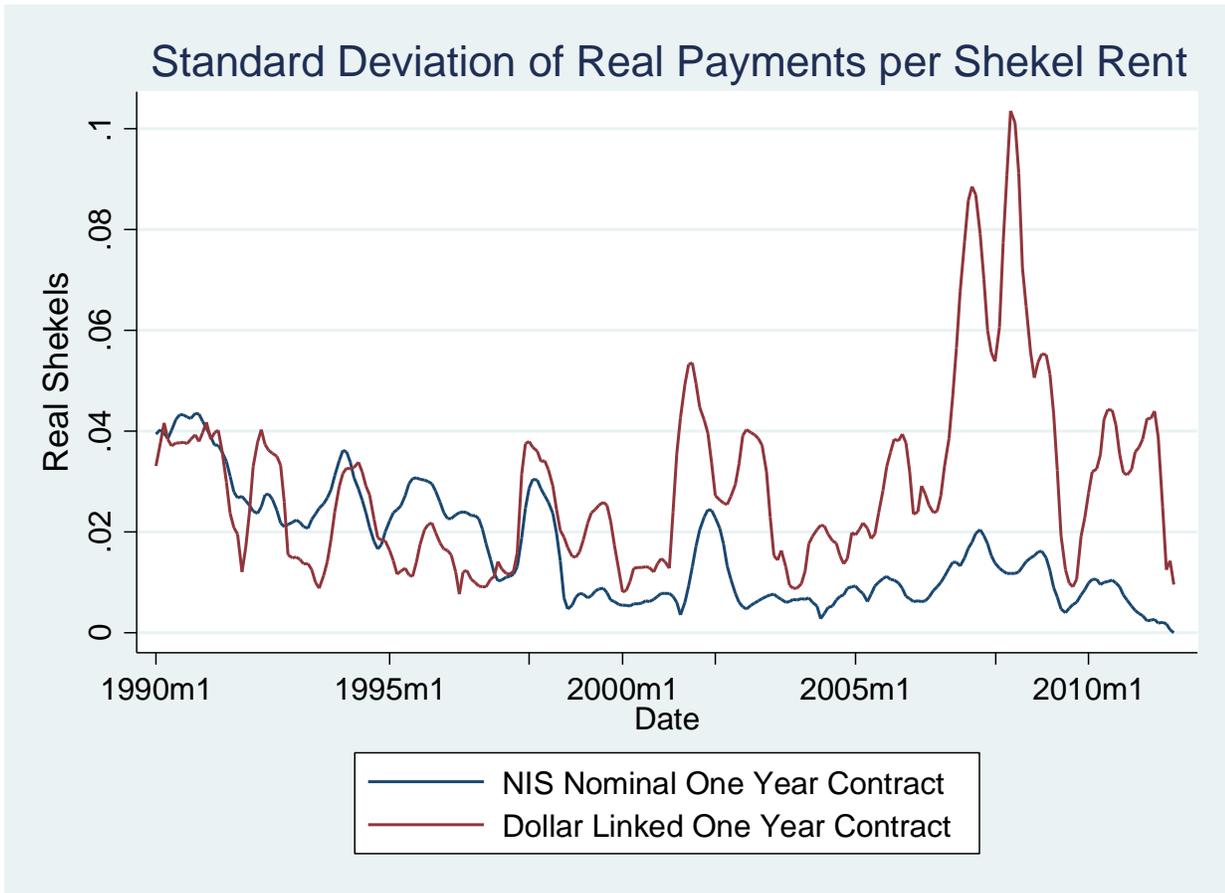
Figure 3: Standard Deviation of Real Payments per Shekel Rate,

**for NIS Nominal and US Dollar Linked One Year Contract**
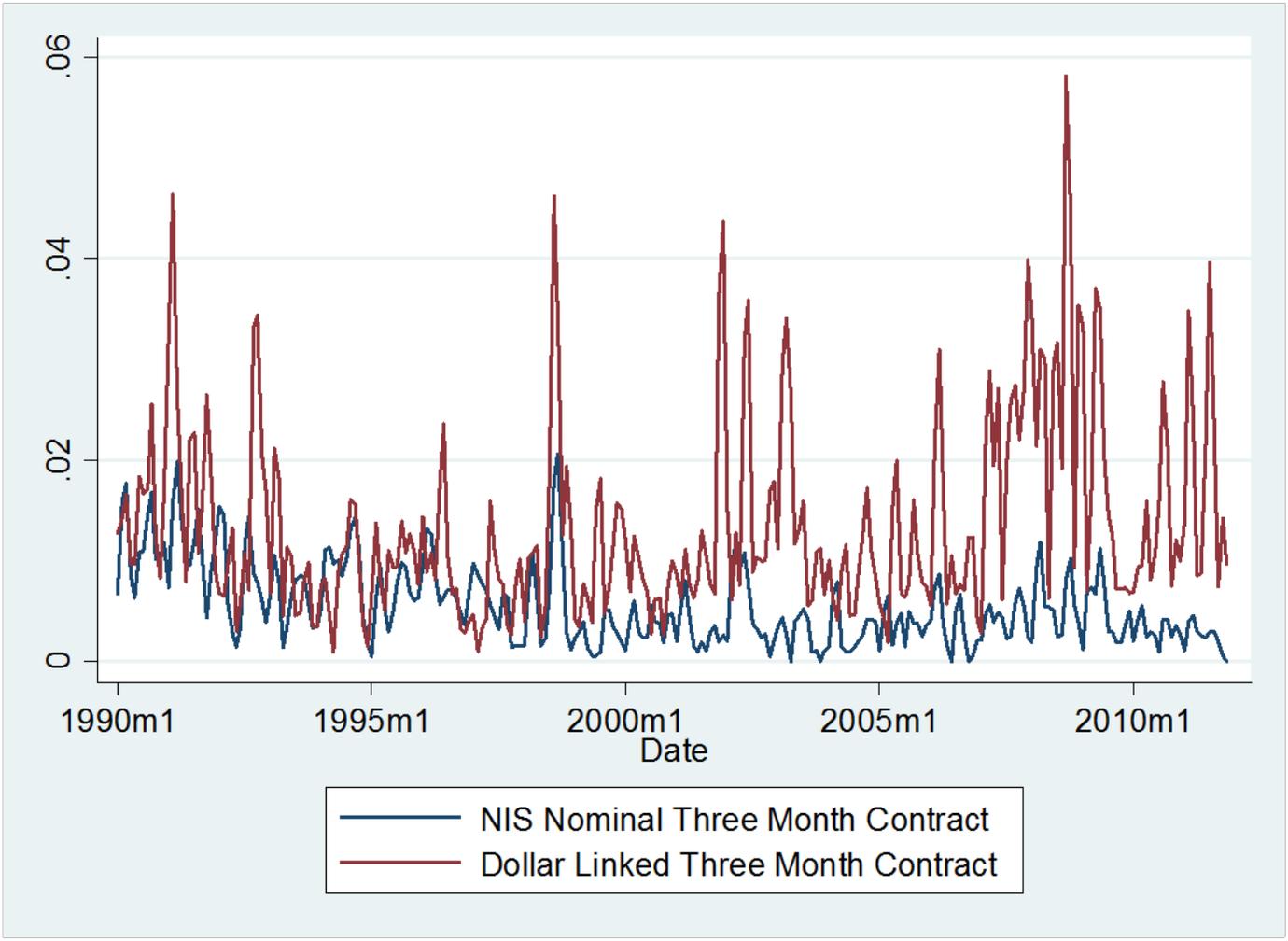
Figure 4: Standard Deviation of Real Payments per Shekel Rate,

for NIS Nominal and US Dollar Linked Three Month Contract
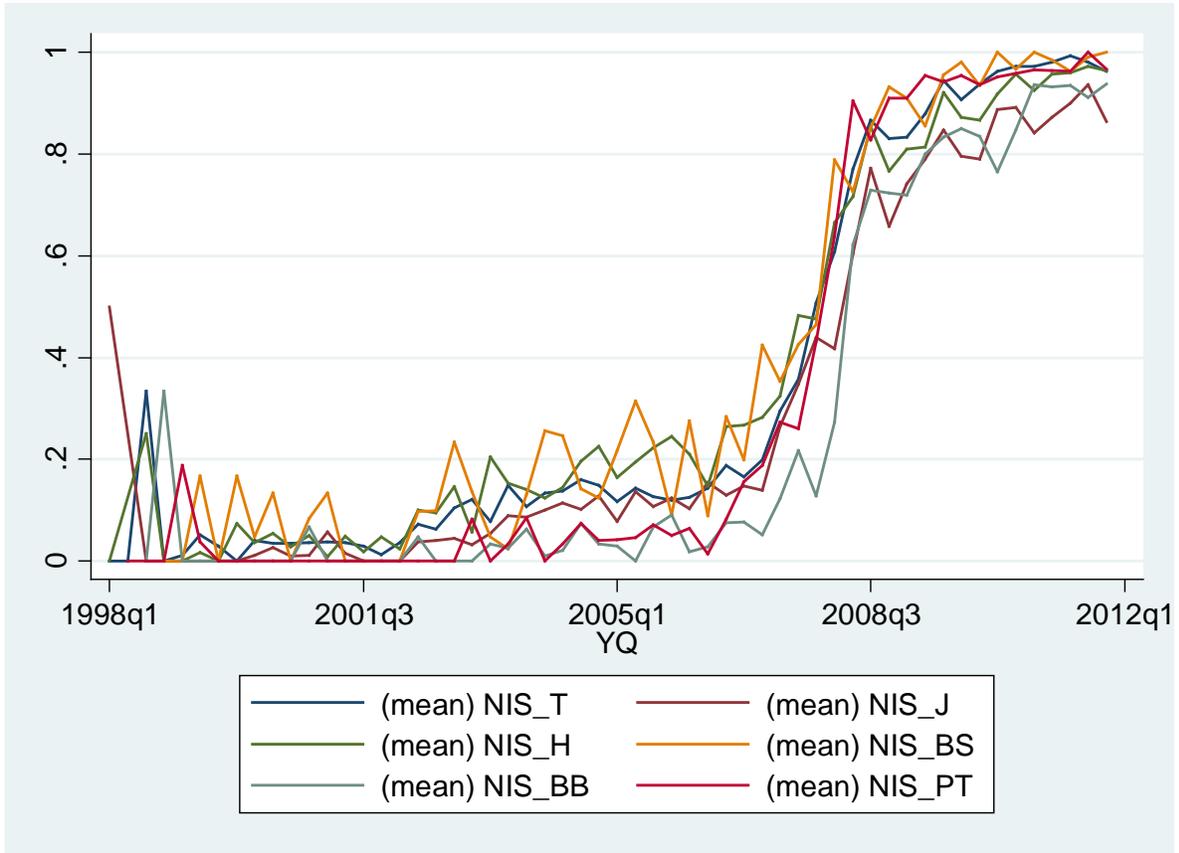
Figure 5: Incidence of NIS use in Housing Transaction Prices, by City

(T: Tel Aviv, J: Jerusalem, H: Haifa, BS: BeerSheva, BB: Bnei Braq, PT: Petach Tikva)
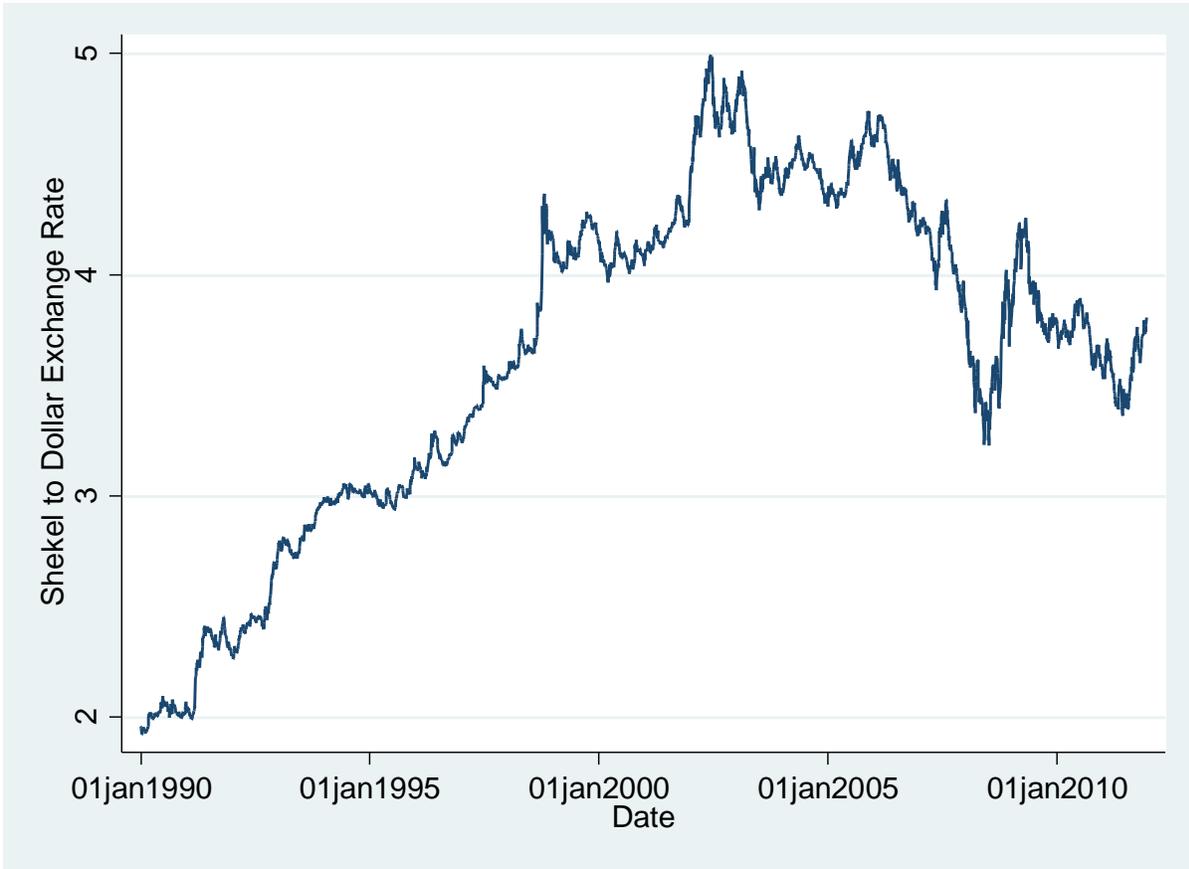
**Figure 6: Shekel to Dollar Exchange Rate, Monthly, 1990-2014**
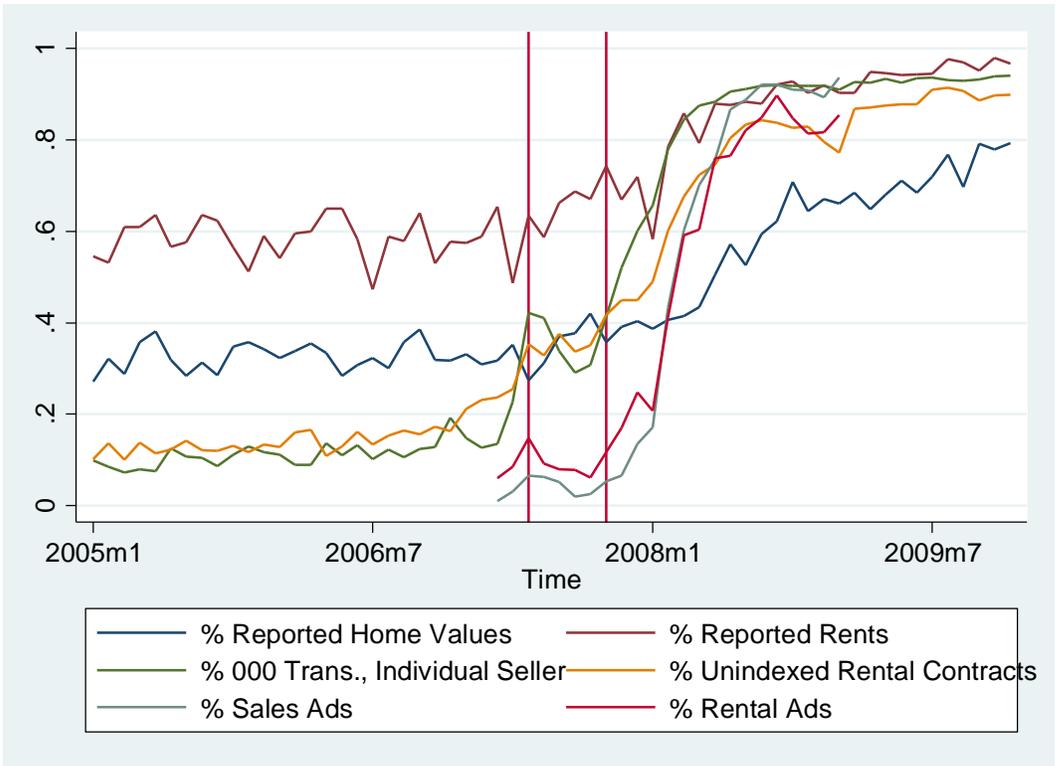
Figure 7: The Six Major Series, with focus on May to October 2007
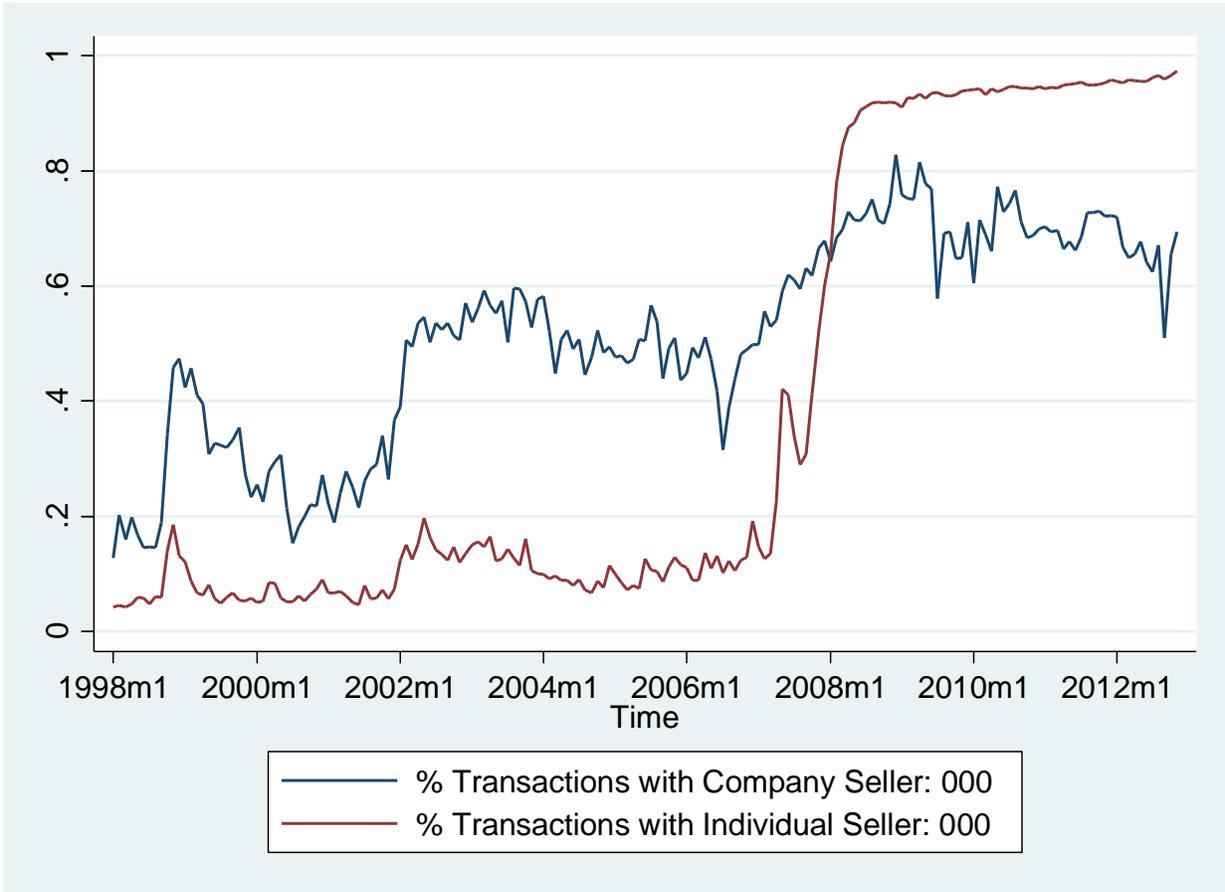
Figure 8: Incidence of NIS use in Housing Transaction Prices,

by Company or Individual Seller
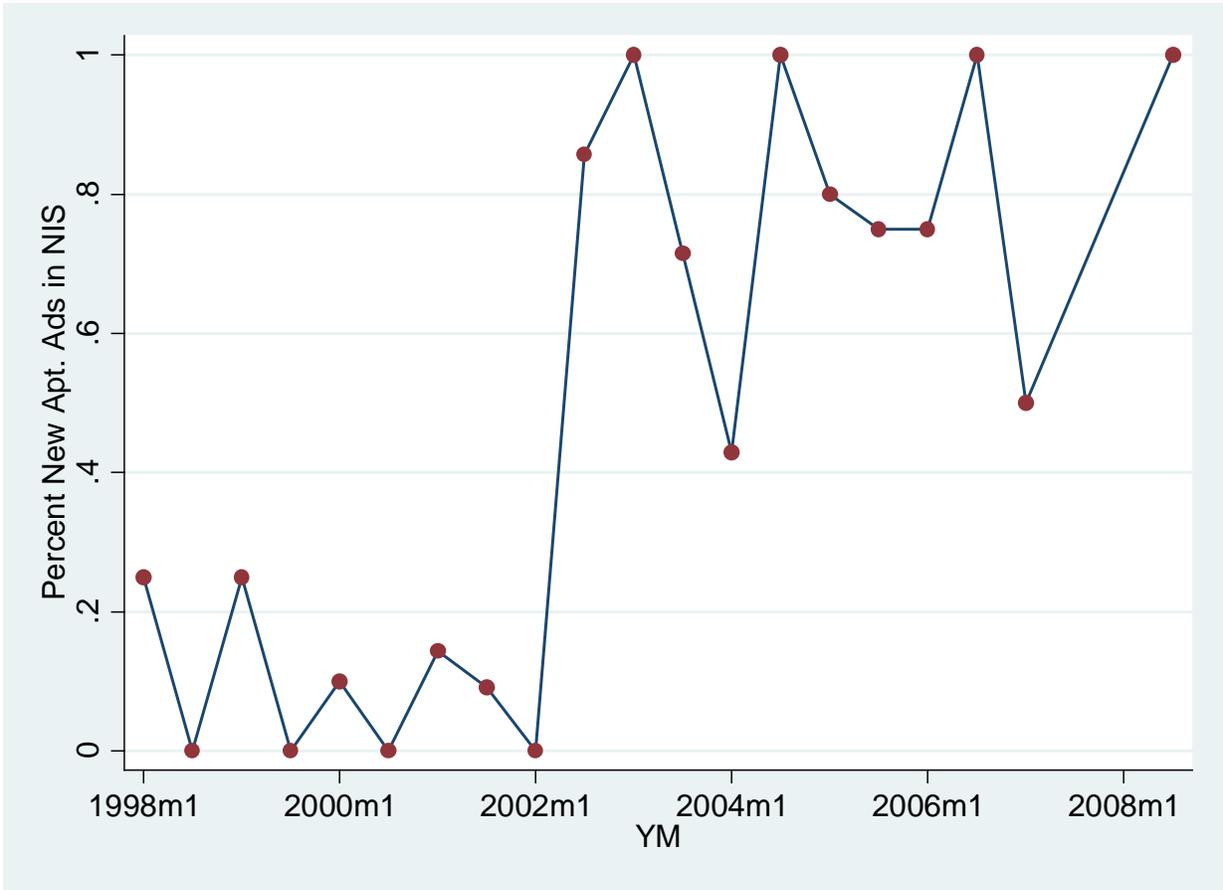
Figure 9: Incidence of NIS pricing in New Housing Display Ads, Quarterly 1998-2008
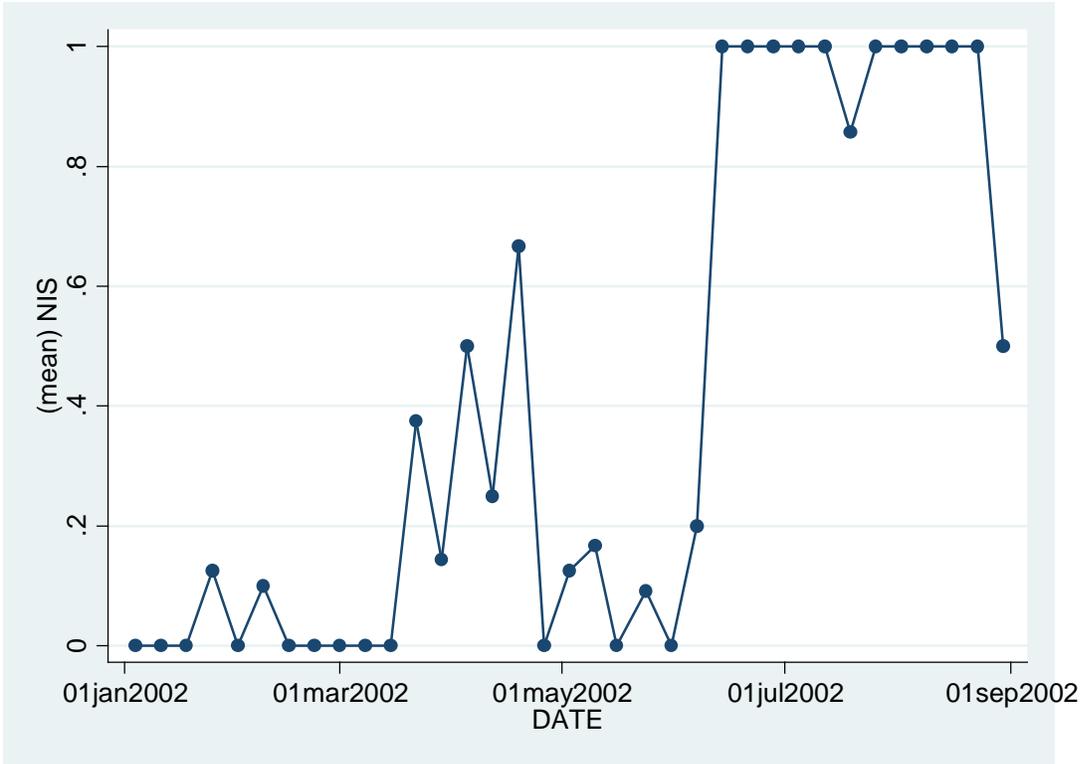
Figure 10: Incidence of NIS pricing in New Housing Display Ads,

Weekly January-September, 2002
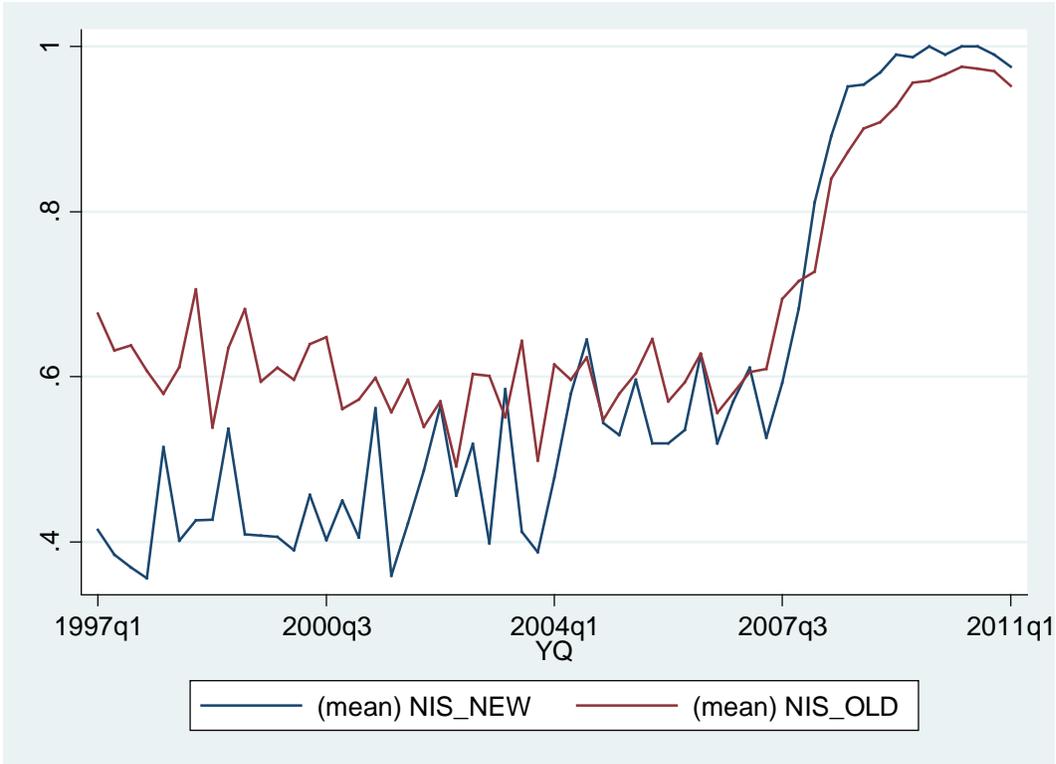
Figure 11: Incidence of NIS use in CES Reported Monthly Rental Payment Quarterly, by Company or Individual Seller

NOTE:

Nonetheless as of 2017, the MOF continues to display dollars (in addition to shekels) in its calculation of taxes.

https://www.misim.gov.il/svsimurechisha/FrmHishuv.aspx