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King Abdullah Petroleum Studies and Research Center

Commentary

The Impact of Population Dynamics on Housing Demand and Residential Energy Consumption in Saudi Arabia

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Saudi Arabia has witnessed explosive population growth over the past half century. The Kingdom's population is expected to continue to grow and generate more housing demand in the coming decades. As the country attempts to curb its fast growing domestic energy consumption, population dynamics will impact the residential building sector and its consequent energy demand. A more energy-efficient residential sector will be increasingly important in helping policymakers manage the country's growing energy usage.

Between 1970 and 2018, the Kingdom's total population grew from less than 6 million to over 33 million, a per annum growth rate of 3.7%. This places Saudi Arabia in the top 10 countries with the fastest population growth during this period. This demographic expansion is, on the one hand, attributable to high fertility, a sharp drop in child mortality and continual improvements in life expectancy. It is also driven by the continuous inflow of migrant workers and their dependents, drawn by the country's booming oil sector and the industrialization of the Saudi economy.

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The dramatic rise in the Kingdom's population has many important implications for the country's economy. While the abundant labor supply has opened up opportunities for faster economic development, with ever-increasing domestic demand for public goods (e.g., energy and water) and services (e.g., education and health care), it also brings forth challenges for the country's fiscal authorities and policymakers. Among the most important needs of the rapidly growing population are residential housing and the resultant demand for residential energy consumption. Housing and construction is a core consumer demand and is a key economic sector that dominates the Saudi economy. The residential sector is one of the fastest growing energy consumer sectors and generates the largest demand for electricity in the Kingdom (Figure 1).

Residential energy demand, and in particular residential electricity demand, is primarily driven by the following determinants: the total number of households, the per capita living space, the energy efficiency/intensity of residential housing and household appliances, and other factors such as consumer behavior. Population dynamics in the Kingdom directly impact most of these determinants.

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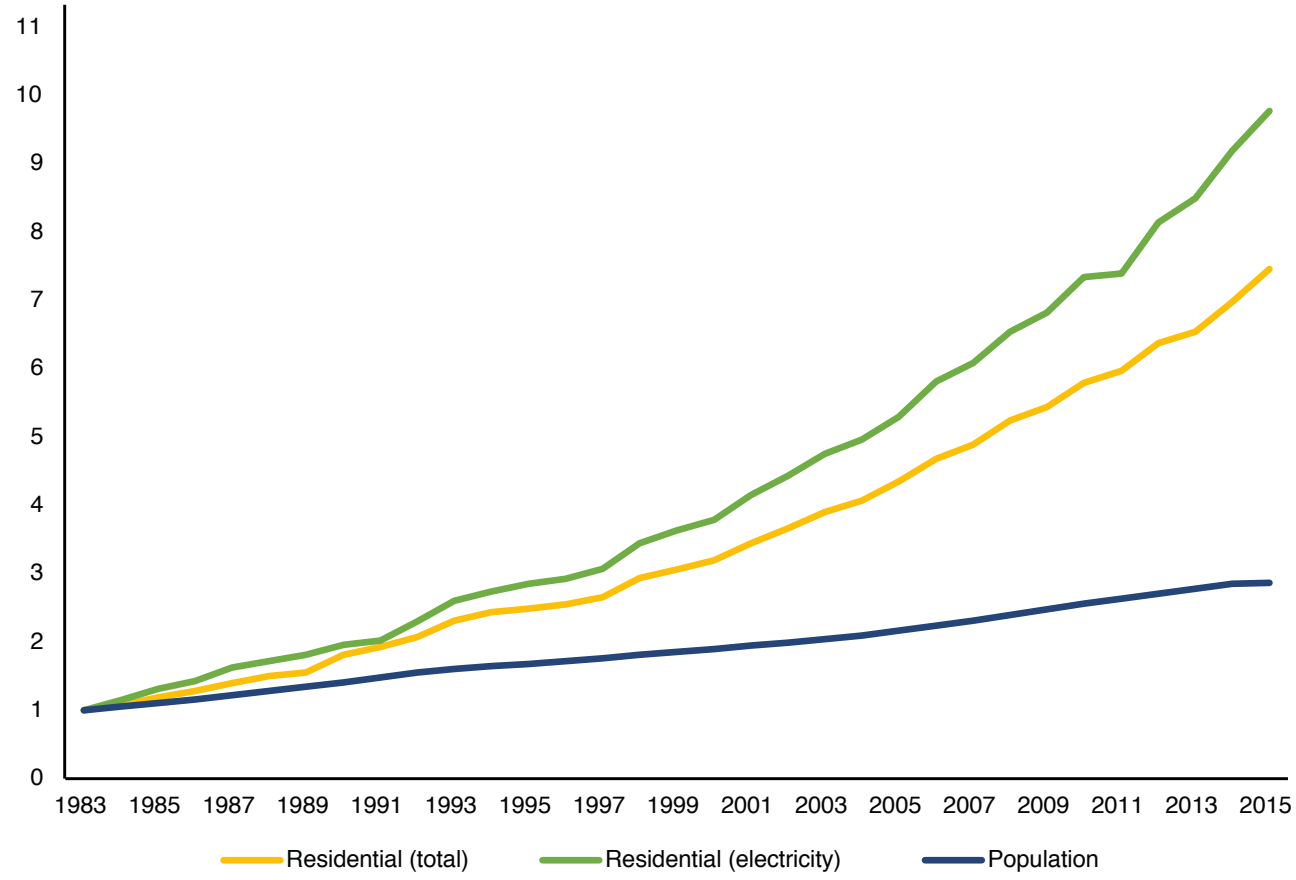
The most impactful driving force of housing demand and residential energy consumption is the number of households: a greater number of households will need more housing units and consume more energy/electricity. The aggregate household figure is, in turn, affected by fertility, population age structure changes, and immigration. Saudi Arabia's fertility rate was among the world's highest, peaking in late 1970s. Since then, the Kingdom has seen a steady transition toward a lower fertility rate, shifting the Saudi population age structure from a typical pyramid shape to a dome shape characterized by a decreasing share of the youth population and a dominance of young adult age groups, as suggested by the population pyramids in Figure 2. They depict the share of population cohorts by age structure and nationality. The past two decades have witnessed a significant share of younger cohorts marrying and bearing children, which has led to the formation of many new households and has increased the demand for new residential housing. Adding to that is the housing demand from immigrants, of which there has been a continuous net inflow over the

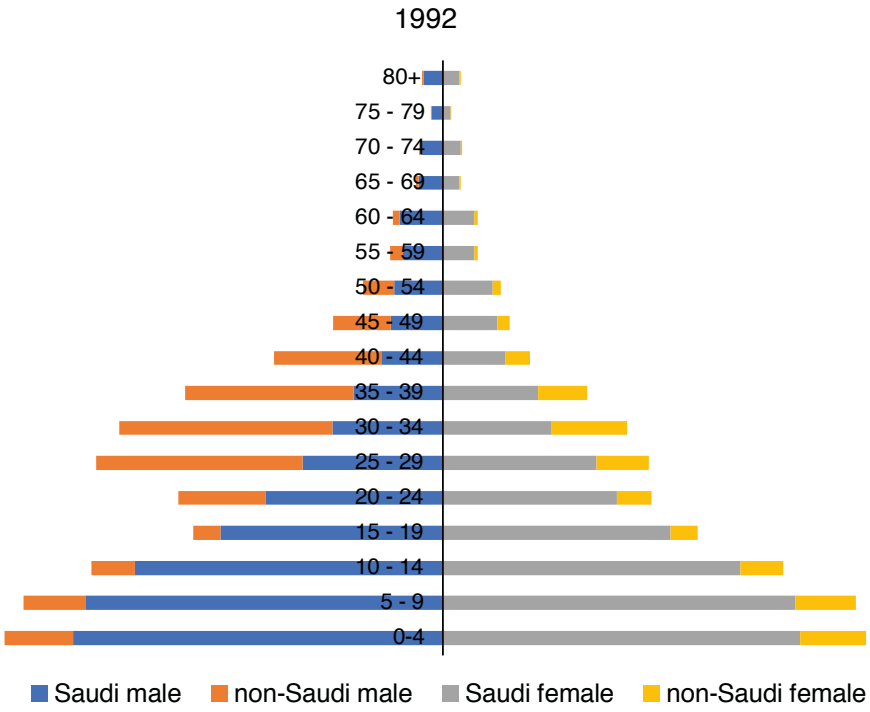
last 40 years, even during the Kingdom's recent economic slowdown. The ever growing share of expatriates in the total population suggests that immigrants play an increasingly important role in driving the Kingdom's housing demand and its residential energy consumption.

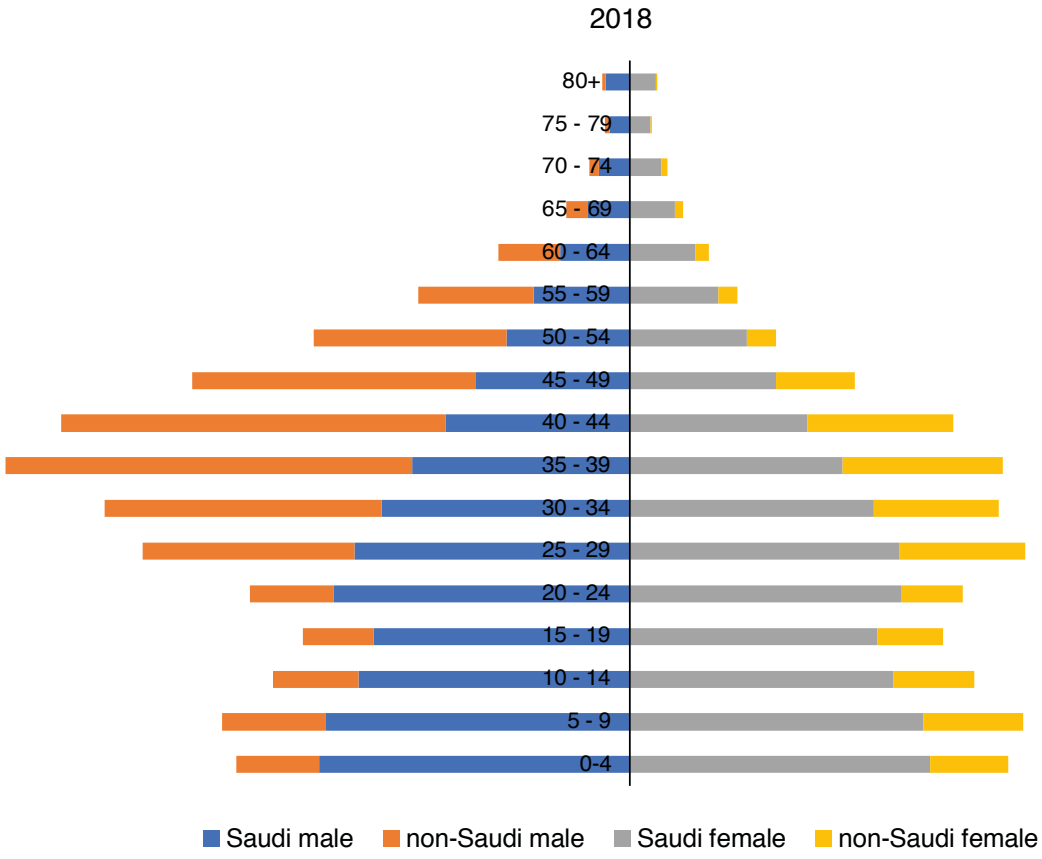
Figure 1. A comparison of population growth and energy consumption growth by various sectors in Saudi Arabia from 1983 to 2015 (1983=1).



Sources: IEA World Energy Balance 2017; Saudi Arabia Monetary Authority; General Authority of Statistics, calculated by the author.

Figure 2. Population pyramid of Saudi Arabia, 1992 and 2018.





Source: General Authority of Statistics.

The average household size may affect residential energy consumption: smaller households (i.e., fewer household members) occupying the same housing area means a larger living space per person and, therefore, potentially more energy consumed per capita. The decline in fertility and persistent net immigration has given rise to a perceivable trend toward a smaller average household in the near term. The evolution of the housing market suggests that the supply of new residences has also accommodated this trend, as apartments (which are smaller than other housing types) account for most new housing developments (Figure 3). As a result, per capita living space, as proxied by the inverse of the number of individuals per room (for Saudi households), shown in Figure 4, seems to have only slightly increased during the last 25 years.

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Saudi Arabia has witnessed considerable improvements in urban housing infrastructure and a transition toward a more energy-intensive lifestyle over the past twenty years, driven by rising incomes and rapid urbanization. As Figure 3 shows, most new housing developments provide modern accommodation such as apartments and villas, which are connected to newer energy infrastructure and have become more energy intensive. Moreover, many young Saudi households choose rental apartments due to their smaller household sizes and other (e.g., financial) reasons. With the number of children born to each family and the average age of the head of the household growing over time, home ownership and the demand for more quality housing will also increase. According to Figure 5, villas are more popular than apartments among the new housing types. Therefore, substantial demand for newer and more energy-intensive housing – especially from Saudi households hoping to move from apartments to villas, with the increases in space, comfort and privacy the latter provide – should be expected in the longer run.

Substantial demand in Saudi Arabia for newer and more energy-intensive housing should be expected in the longer run.

To sum up, demographic changes in Saudi Arabia will likely impact the demand for housing and residential energy consumption in several important ways. Current evidence shows that the demographic trend toward a smaller average household size may not have resulted in a substantial increase in per capita living space. However, given the growing number of households and their preference for higher quality and energy-intensive housing, population growth still imposes a strongly positive effect on the Kingdom's residential energy consumption. Since these trends are long term and cannot easily be reversed, decision-makers keen to contain the fast growth of residential energy demand should be aware of policy instruments that could be used to counter these impacts. One solution to mitigate the effects of these demographic and lifestyle changes could be to promote more stringent energy efficiency standards for all new residential housing units and electrical appliances. Renovating or replacing the Kingdom's large stock of less energy-efficient housing units and electric appliances could also help mitigate these demographic impacts on energy demand. Furthermore, adjusting energy pricing (e.g., electricity tariffs) is another useful instrument that can help incentivize energy-conserving behavior by end users and promote the purchase of high-efficiency appliances. Consumers will have to pay more for their energy bills and will therefore be forced to adjust their behavior and seek more energy-efficient appliances. In this regard, Saudi Arabia's recently enacted energy price reforms are a move in the right direction to reduce the fast growth of energy consumption in the residential sector.

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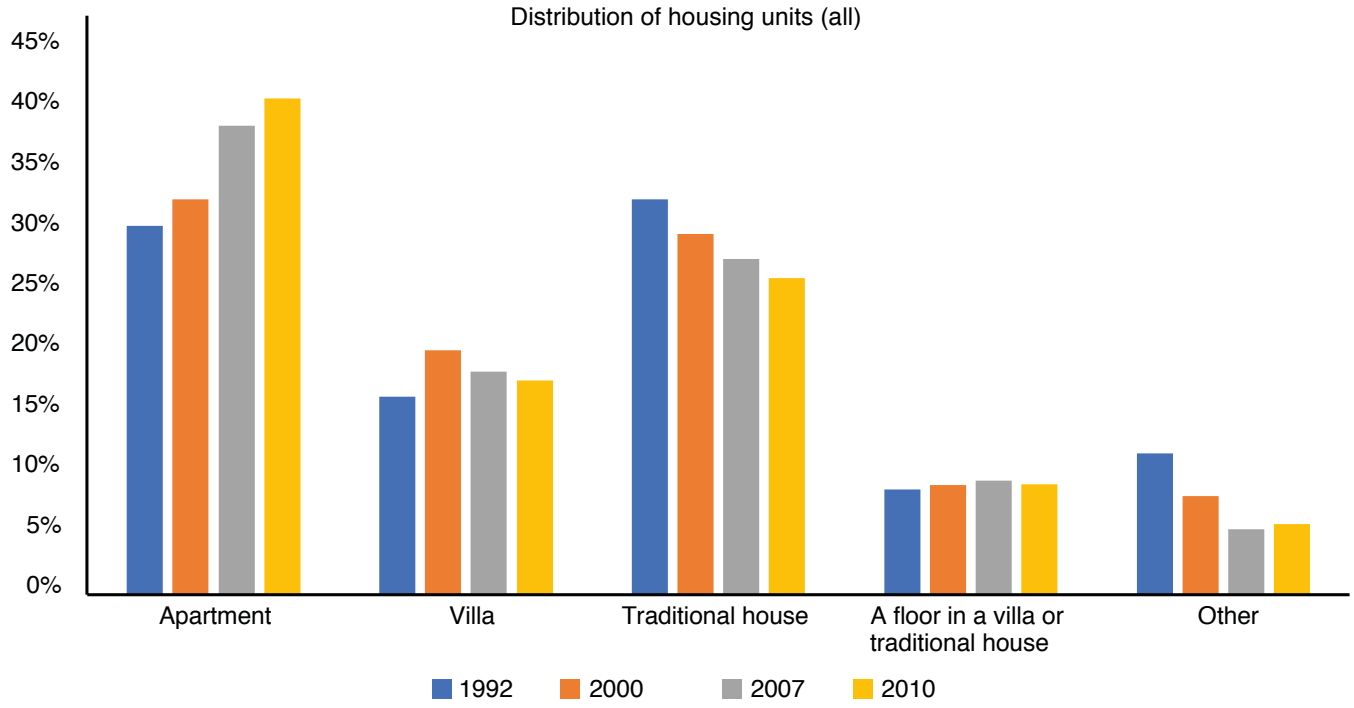
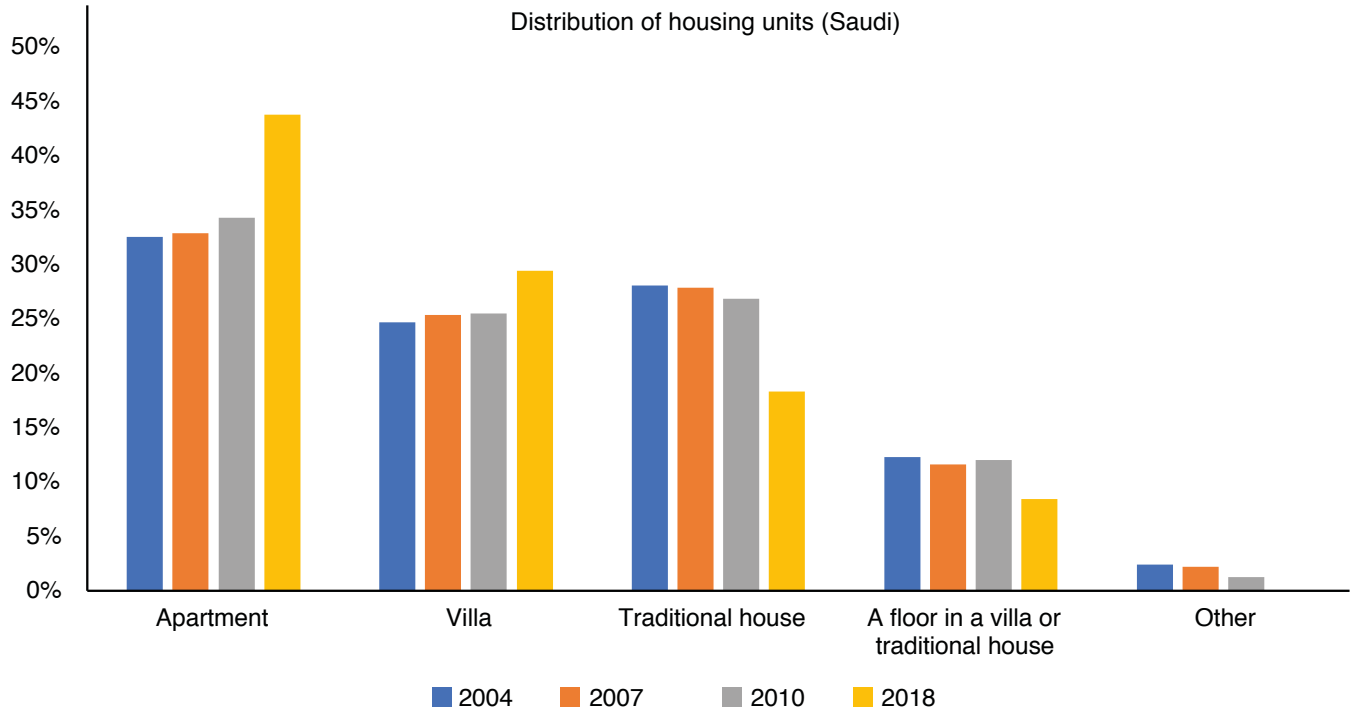
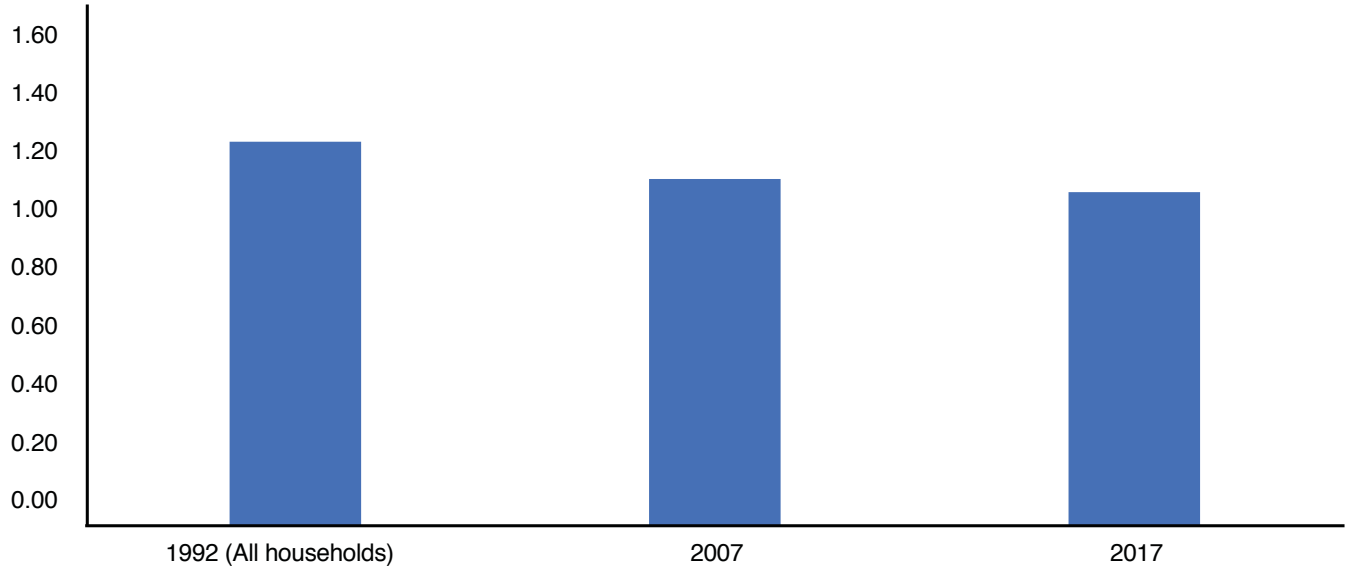
Figure 3. Distribution of housing stock by housing type, for all households (1992-2010) and Saudi households (2004-2018).





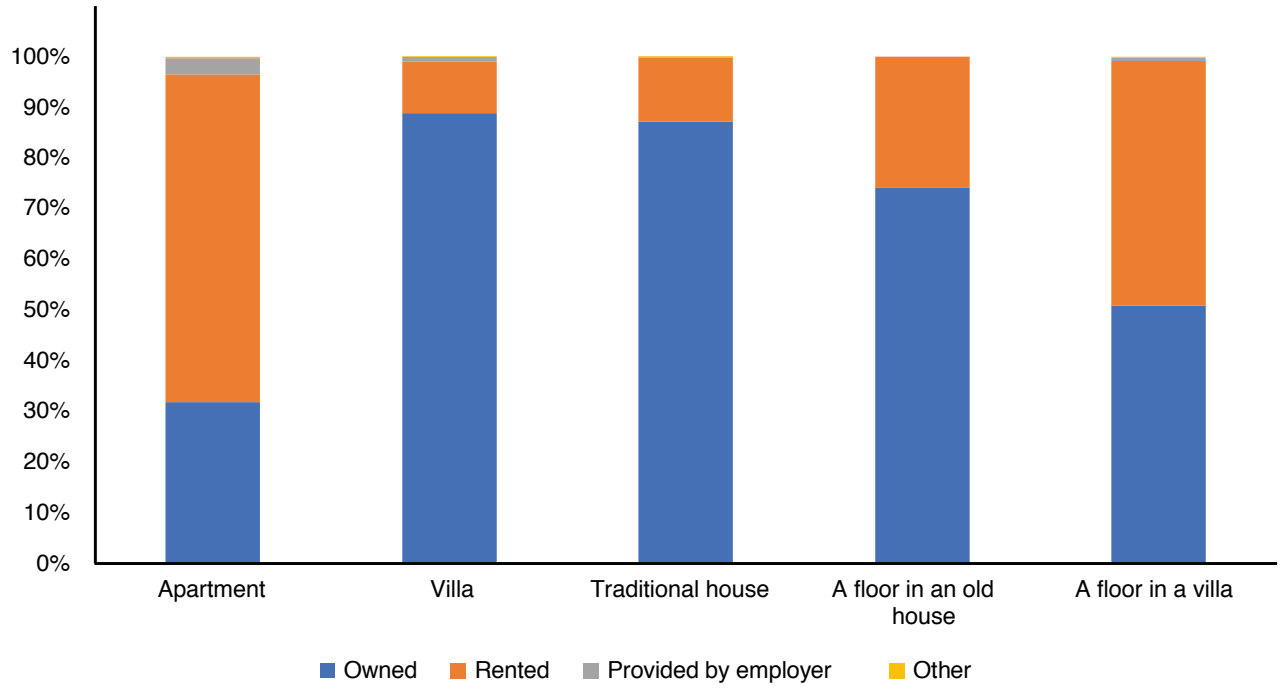
Source: General Authority of Statistics.

Figure 4. Individuals per room in Saudi households, 1992-2017.



Source: General Authority of Statistics, calculated by the author.

Figure 5. Tenure of housing by Saudi households across different housing types, 2018.



Source: General Authority of Statistics, calculated by the author.

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