GREYSCIENX RESEARCH NOTE

Inherited Geography

Thirty years after apartheid ended, how much of its property geography is still compounding?

5 cents	42%	R1.57m
median Black:White wealth, 2017	Black estate-leavers in townships	modeled township-to-suburb gap

GreyScienx | Research publication

Inside the note

A map of the argument, model, evidence, and qualifications.

Thirty years after apartheid ended, how much of its property geography is still compounding?

PART I

The answer

PART I: The answer

The law stopped sorting property by race. The property did not move.

Apartheid did not merely leave South Africans with unequal quantities of property. It left them with different **kinds** of property, under different legal systems, in different markets and at different distances from opportunity. A suburban house with clear title, deep buyer demand and a functioning mortgage market is not the same financial instrument as an equally cherished family home held through communal tenure, an inherited township house with several claimants, or a farm without reliable water and operating capital. Each may supply shelter, belonging and security. They do not supply the same resale value, liquidity, collateral, rent, appreciation or productive income.

That distinction is the answer to this paper's central question. South Africa's inherited property geography retains economically material momentum three decades after apartheid. But the share of the national racial wealth gap **caused** by that mechanism cannot be identified from currently available data. No national source follows an inherited property from parent to heir while jointly observing population group, legal title, location, multiple claims, marketability, rent, collateral use and the heir's later wealth.

What can be identified is the scale of the starting divide, the geography of formal estates, the segmentation of the registered housing market and the capacity of different property bundles to compound. The evidence is strong on each component and weak on the one causal number that would join them.

This paper therefore gives two answers.

The descriptive answer: formal inheritable wealth, high-value housing and individually titled agricultural land remain very unevenly distributed across the population groups created and enforced by South African law. In 2017 NIDS data, the median Black household had net worth of about R70,100 and the median White household R1,364,900. Probate estimates for 2009-2019 indicate that 3% of Black African adults, 9% of Coloured adults, 23% of Indian or Asian adults and 45% of White adults held formal probatable wealth above R250,000. Among Black estate-leavers whose estates reached the Gazette in 2019, 42% lived in former townships and 17% in former homelands. These are household, threshold and selected-estate statistics, not statements about any individual. Chelwa, Maboshe and Hamilton (2024); Simson and Mahmoudzadeh (2024).

The modeled answer: for descendants with the same education, real salary, household size and saving behavior, inherited property conditions can generate large differences over a working life. In the central Monte Carlo case, median marketable net worth after forty years is R3.04 million without inherited property, R3.15 million with a communal family residence, R3.67 million with a titled township home, R5.24 million with a middle-value suburban home, R10.59 million with high-value property and R6.51 million with a productive farm. All are constant 2024 rand. These are scenarios, not forecasts or racial-group estimates.

The R1.57 million modeled difference between the titled-township and middle-suburb medians after forty years is of the same order as the 2017 Black-White median household wealth gap reported in NIDS. The R7.44 million difference between the communal-residence and high-property cases is larger. That comparison demonstrates **scale sufficiency**: inherited property conditions could be large enough to reproduce a gap of the observed order. It does not demonstrate attribution. Earnings histories, pensions, business ownership, marriage, household composition, debt, discrimination, taxes, public services and many other mechanisms also shape wealth.

Central conclusion. The inherited geography mechanism is large enough to matter, persistent enough to compound and too poorly linked across datasets to reduce to a credible national percentage. The honest result is a range of property momentum, not a claim that race predicts an individual's wealth or that one mechanism explains every group difference.

GREYSCIENX / OBSERVED EVIDENCE

Formal wealth is uneven - and the sources disagree in patter

Adults with wealth above R250,000: probate estimate (2009-2019 pooled) and NIDS Wave 4 (2014/15).

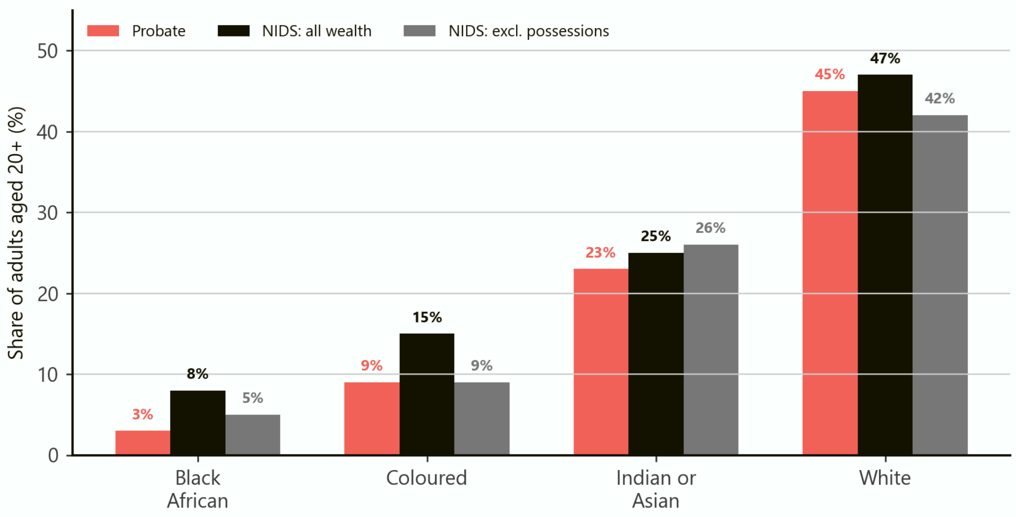

Figure 1. Probate and survey evidence agree on the ordering but not the level. Probate misses unreported and off-register assets most severely for Black and Coloured households. NIDS captures a broader wealth concept but undersamples the top and relies partly on self-valuation. The disagreement is information, not noise to be averaged away.

Three kinds of statement

Every substantive claim in this paper belongs to one of three classes.

Class	What it means	Examples in this paper
Observed	Directly reported by an official, administrative or survey source	Census tenure; deeds transactions; probate thresholds; commercial-farm counts
Descriptive	An association or pattern in observational research	Housing value by settlement pathway; distance and employment; title and formal borrowing
Modeled	A result generated from disclosed assumptions	Twenty-, forty- and sixty-year wealth distributions; channel decomposition; agricultural counterfactual

There is no core causal estimate. The South African evidence does not randomise inherited location, title or property type. The matched-descendant model is a controlled counterfactual, not a claim that its parameters have been causally estimated.

Ten findings

First, ownership is not enough. Census 2022 reports that 41.6% of households lived in a dwelling owned and fully paid off and another 6.6% in one owned but not yet paid off. Yet tenure in the occupied dwelling does not reveal who is on the deed, whether several relatives claim the property, whether it can be mortgaged, or whether a buyer can be found. Statistics South Africa, Census 2022.

Second, the formal wealth gap survives controls that income stories should have closed. NIDS-based research finds a large Black-White median wealth gap within education and income categories. That is descriptive evidence against the proposition that current education or earnings alone erase accumulated asset differences. It is not proof that inherited property is the only residual cause. Chelwa, Maboshe and Hamilton (2024).

Third, formal inheritance data select the very thing under study. Probate records are most complete where assets are titled, estates are reported and families can navigate formal administration. Those conditions are themselves unequally distributed. The 3% Black formal-wealth threshold is therefore both evidence of inequality and a lower-bound-like measure distorted by weaker reporting.

Fourth, a township house is real wealth. In the model it supplies shelter, avoids housing expenditure, can generate rent and may appreciate. A central titled-township inheritance raises forty-year median marketable net worth by about R630,000 relative to no property. Calling it worthless would be empirically wrong and socially obtuse.

Fifth, location changes the same house's financial reach. Buyer depth, mortgage finance, municipal services, crime, travel time, school access and job proximity enter a property's rent, vacancy, price and collateral value. The formal urban category is not one market.

Sixth, illiquidity is not absence of value. A communal family residence can have low private resale and collateral value while delivering large residential, productive, social and custodial value. The agricultural module makes this distinction visible by reporting marketable value and broader resource value separately.

Seventh, heirs divide more than a price. Several heirs may share equity, occupation, rental income and obligations differently. A saleable house can become unsaleable when title remains in the deceased's name or relatives disagree. The model treats the number of heirs and administration costs as distributions.

Eighth, water and working capital can matter as much as hectares. In the agricultural module, identical starting land moves from a median twenty-year marketable result of R0.87 million under communal, rain-fed conditions to R5.56 million with freehold, water access and operating capital. The broader resource values are R3.06 million and R5.88 million. Title changes finance; water and capital change production.

Ninth, compounding does not eliminate overlap. A weak property draw can underperform no property after costs. A township asset in a strong submarket can outperform a suburban asset with debt, several heirs and weak appreciation. Population-group distributions overlap; race is not a balance sheet.

Tenth, the best estimate is a disciplined uncertainty statement. The mechanism is consistent with the observed evidence and large in plausible scenarios. Its national causal contribution remains unidentified. Better linked deeds, probate, survey and municipal data could narrow that answer.

PART II

What exactly is inherited?

PART II: What exactly is inherited?

A title deed is not the asset; it is one of the asset's operating systems

Property is often entered on a balance sheet as one number. An inherited property is better understood as a bundle of claims and services.

Market value is the price a willing buyer might pay. It depends on legal transferability, comparable transactions, demand and the ability to finance a purchase.

Residential use value is the shelter and security the property supplies. A home can be economically valuable even when no sale is possible. Avoided housing expenditure is one part of this value, not the whole of it.

Liquidity is the speed and certainty with which the asset can be converted into money without a large discount. A high appraisal in a thin market can coexist with low liquidity.

Collateral value is the credit a lender is prepared to advance against enforceable rights and recoverable value. It is normally smaller than market value and can be close to zero even when use value is high.

Rental value is the net income remaining after vacancy, collection risk, maintenance, rates and management. Backyard rooms can produce income that a deeds database cannot see.

Appreciation is the change in real asset value. It depends on location, services, market depth, neighbourhood change, maintenance and the initial price.

Productive value is the income land can generate through farming or enterprise. Hectares without water, fencing, roads, machinery, market access or working capital are not technically equivalent to equipped hectares.

Social and customary value includes belonging, burial and ancestral connection, family security, access for relatives and custodial obligations. It is real but not responsibly collapsed into a made-up rand price.

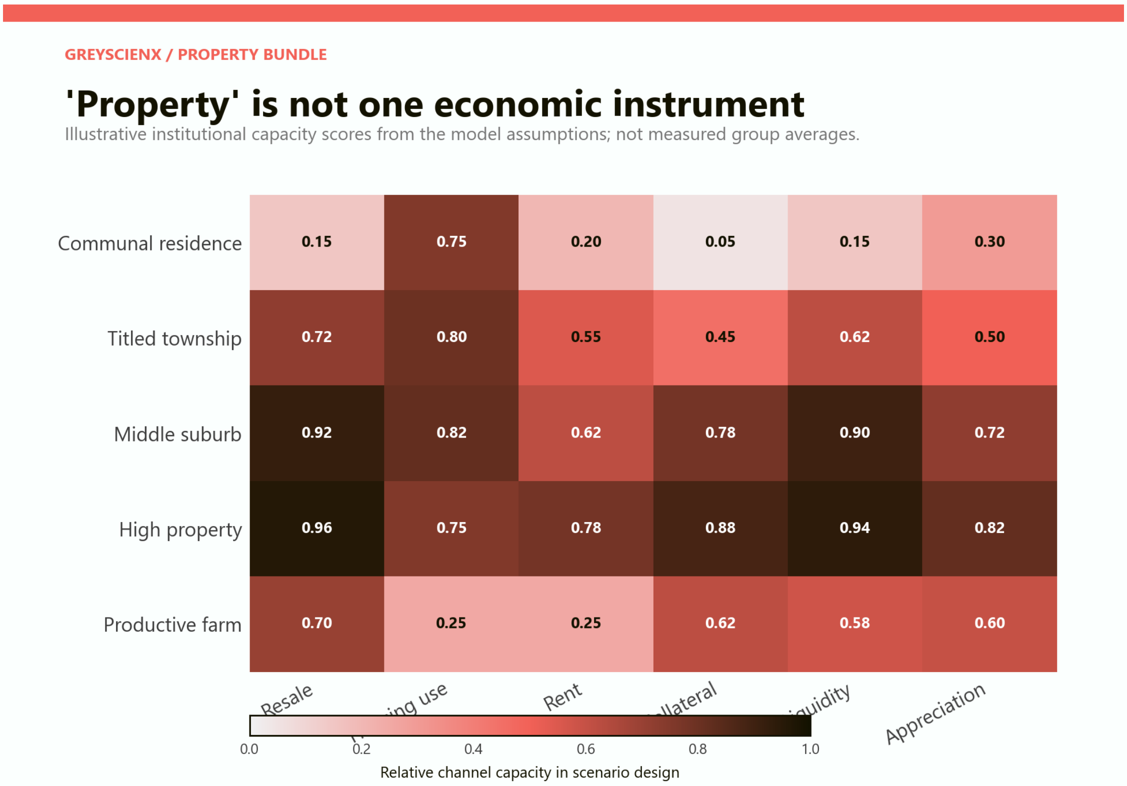

Figure 2. The heatmap is a visual summary of model assumptions, not observed racial averages. It shows why one word - property - can conceal six different economic capacities.

Six inherited conditions

The model uses six property conditions. Their central starting values organise scenarios; they are not national medians.

Condition	Central gross value	Legal and market character	Main channel
No inherited property	R0	No transferred asset	Earnings and saving only
Rural or communal residence	R350,000	Strong use claim; low private sale and collateral in central case	Shelter and family use
Titled township home	R560,000	Transferable title; thinner mortgage and resale market	Shelter, rent, modest equity
Middle-value suburban home	R1.50m	Deep formal market and mortgage access	Equity, housing savings, collateral
High-value property or small portfolio	R4.50m	Deep market, diversified rental potential	Equity, rent, collateral
Productive agricultural property	R3.50m	Value depends on title, water, infrastructure and operating capital	Land equity and farm income

The township anchor is close to the R560,570 average price of mortgage-financed government-subsidised-property resales reported for 2023. That is a useful market observation, not a universal township value. The suburban and high-property values deliberately cross the CAHF segments at R1.2 million, R1.5 million and R3 million. CAHF, South Africa Housing Market Report 2024.

Marketability can be more unequal than shelter

Census 2022 recorded 17.8 million households. CAHF's deeds-based report counted 6.91 million registered residential properties at the end of 2023. The numbers are not meant to match: households rent, share properties, occupy informal or traditional dwellings, live in title-backlog houses, or occupy property registered to another person. The gap shows why a household housing statistic cannot be converted mechanically into a titled-asset statistic.

Within the registered market, two-thirds of properties were valued at R900,000 or less and 76% below R1.2 million. Yet transaction finance rose sharply with value. In 2023, only 12% of resale transactions below R300,000 were bonded, compared with 47.8% between R300,000 and R600,000 and about 60% from R600,000 to R3 million. Low-value property is not outside the market, but it is connected to a different market.

The resale count is also small relative to the stock. CAHF records 150,738 residential resales in 2023, or roughly 2.2% of the 6.91 million registered properties. This crude ratio is not a formal liquidity estimate - the numerator and stock have different selection and timing - but it warns against assuming that every appraised property can be sold promptly.

PART III

The inherited map

PART III: The inherited map

Racial categories are historical records, not biological causes

This paper uses the population-group labels Black African, Coloured, Indian or Asian, and White because the source data use them and because law used related categories to allocate residence, title and land. The categories were administratively produced, coercively enforced and socially reproduced. They are analytical records of institutions, not innate explanations of behavior, ability or wealth.

Census 2022 reports population shares of 81.4% Black African, 8.2% Coloured, 7.3% White and 2.7% Indian or Asian. Those national shares do not map neatly onto household shares, adult shares, ownership, estate incidence or wealth. A claim with one denominator must not be silently applied to another. Statistics South Africa, Census 2022.

Within-group inequality is enormous. Distributional accounts estimate that the top 10% of South African adults own more than 85% of personal wealth and the top 1% about 55%. NIDS research has found particularly high wealth inequality within the Black African population. The group median hides affluent Black property owners, White households with little or negative wealth, and broad overlap across groups. Chatterjee, Czajka and Gethin (2022); Mbewe and Woolard (2016).

The wealth gap is a stock, not a wage gap

Chelwa, Maboshe and Hamilton report 2017 median household wealth of R70,100 for Black households and R1,364,900 for White households. Median Black wealth was 5.1% of median White wealth. The gap persisted across education and income groups; among the highest income group, the typical Black household still had less than 30% of the wealth of the typical White household.

This is descriptive evidence. Household education is measured by the head's attainment; household wealth pools assets and debts that may be controlled unequally; survey data miss much top wealth. The result cannot tell us whether property inheritance, lifetime earnings, pension coverage, business ownership, family transfers or another mechanism created a particular rand of the gap. It tells us that equal current income is not equal accumulated balance sheet.

Household aggregation also hides gendered control. Recent NIDS research finds substantial intra-couple wealth inequality and asset-class differences. A house recorded in household net worth does not prove equal authority to sell it, pledge it or receive its rent. Casale and Oyenubi (2026).

Probate sees formal wealth through a narrow window

Simson and Mahmoudzadeh assemble estate records from the Master's Office and Gazette notices. The R250,000 threshold separates simplified administration from full executorship. Their mortality-adjusted pooled estimates suggest that 9% of adults aged 20+ held formal wealth above the threshold. The group estimates are 3% Black African, 9% Coloured, 23% Indian or Asian and 45% White.

The paper also compares probate with NIDS Wave 4. NIDS puts 8% of Black, 15% of Coloured, 25% of Asian and 47% of White adults above R250,000 when all wealth is counted. Excluding possessions and vehicles changes the estimates to 5%, 9%, 26% and 42%. Probate is reasonably close for White and Asian adults but much lower for Black and Coloured adults.

The direction of bias is intelligible. Families may not report an estate; property may remain in the deceased's name; rights may be communal or informal; a low-value estate may not justify administrative cost; and a name classifier can misclassify population group. Probate selects formal, individualised, reported wealth. That makes it highly relevant to marketability and collateral while making it incomplete as a welfare measure.

The all-estate ratios make the same point. Relative to adult deaths, the study finds ratios of 35% for Black, 45% for Coloured, 59% for Asian and 101% for White decedents. A ratio over 100% is impossible as a literal probability and reflects lags, denominators or record error. The model therefore never treats these ratios as direct inheritance-receipt probabilities.

Estate addresses expose the old map

In the 2019 Gazette sample, an estimated 26% of estate-leavers were Black. Among them, 42% lived in former townships and 17% in former homelands. In Johannesburg and Ekurhuleni, more than 60% of Black estate-leavers in the sample lived in townships, compared with 3-6% of people classified from White or Coloured names.

An address is not an asset inventory. The deceased may own property elsewhere; a home can contain debt; a township address can describe a strong submarket; name-based classification cannot reliably separate all White and Coloured names. Still, when real estate is the dominant middle-class asset, the map is a strong clue that groups are transmitting wealth from different spatial segments.

Formal urban does not mean integrated

Research using NIDS Waves 1-5 divides residence into Tribal Authority Areas, urban informal areas, rural formal areas and urban formal areas. Tribal Authority Areas accounted for 27-32% of the NIDS sample. Within urban formal areas, average imputed rent for White-occupied dwellings was R2,740 in 2008 and R9,424 in 2017; the corresponding African-occupied figures were R461 and R1,627. The relative growth of the latter was faster, but the absolute gap widened. Kirsten and Patel, SALDRU (2025).

Imputed rent is not a sale price, and the study does not identify a causal effect of race. The figures instead reveal that “urban formal” contains sharply different housing submarkets. Race marks historical sorting into those markets; it does not mechanically set a property's value.

Location also affects income opportunities. Older metropolitan evidence found distance from city centres more strongly associated with Black unemployment than White unemployment after education and income controls, while later OECD analysis reports average 2020 commute times of 44 minutes by private vehicle, 63 by minibus taxi, 84 by bus and 107 by train. These are associations and mode averages, not returns embedded in a house price. They show why job access can enter both the use value of a home and the descendant's budget. Naude (2008); OECD Economic Survey 2025.

PART IV

The model

PART IV: The model

A scale test, not a hidden regression

The model asks a narrow question: if two descendants are matched on everything the brief asks us to hold constant, how much difference can the inherited property itself create?

Each matched descendant:

- receives the asset at the start of the simulation;
- begins with R50,000 in liquid wealth;
- earns R420,000 a year in constant 2024 rand;
- saves 8% of earnings;
- earns a central 3.5% real return on financial wealth; and
- is followed for 20, 40 and 60 years.

The earnings level is a convenient control, not an estimate of typical earnings. Because it is identical across cases, it drops out of the incremental comparison.

Property values are lognormal to allow a long upper tail. Real appreciation, marketability, maintenance, rental yield, inherited debt, administrative cost, collateral and financial returns use triangular distributions. A triangular distribution says: the evidence supports a low value, a central judgment and a high value, but not a fitted statistical law.

One hundred thousand draws are run for every scenario with a fixed random seed. The complete machinery is in `model.py`; all parameters are exported to `parameters.csv`; all results are in `model_results.json`. The prose does not hide a mathematical model that the reader cannot inspect.

Multiple heirs and inherited debt

The gross property is not the heir's wealth. The model subtracts inherited mortgage debt and administration costs, then divides economic equity among a random number of heirs. Communal family use is divided less mechanically because several relatives can benefit from the same residence even when no clean sale share exists. Marketability then converts the heir's equity into a liquid-equivalent claim.

This treatment is intentionally conservative about formal wealth and generous about use value. A family home can protect several people from housing costs while none holds a clean, saleable fraction. The two values should not be added without explaining what each means.

Direct channels

The headline model includes four direct channels.

Appreciated property equity is the heir's debt-adjusted share carried forward by the asset's real appreciation and reduced by a marketability factor.

Housing expenditure avoided is a net housing-service yield after maintenance. Only a share is reinvested; the remainder is consumed as a higher living standard. Stats SA used a 7.135% gross rental-yield imputation in the 2014/15 Living Conditions Survey. The model's net ranges are lower.

Rental income is earned only for randomly selected rental use, after vacancy, maintenance and collection costs, and only a share is reinvested.

Productive farm income replaces housing services in the farm profile and includes loss-making draws before truncation for reinvested positive income.

An **extended opportunity channel** allows a fraction of heirs to deploy collateral into education or enterprise. It includes negative net returns and financing costs. Because a true education gain would change earnings, this channel is excluded from the matched headline where salaries must remain equal.

Intergenerational property momentum

This paper defines **intergenerational property momentum** as the future incremental wealth generated by an inherited property bundle relative to an otherwise identical no-property descendant. It can be stated in rand or, cautiously, per rand of initial liquid-equivalent inheritance.

At forty years, the central median increments over no inherited property are R0.11 million for a communal residence, R0.63 million for a titled township home, R2.20 million for a middle suburban home, R7.55 million for high-value property and R3.47 million for a productive farm.

Relative to the initial median liquid-equivalent inheritance, these increments are roughly 6.4, 3.8, 3.4, 3.6 and 3.4 times respectively. The communal ratio is highest because its initial marketability is very low while its housing service persists. It must not be interpreted as a high financial return on a saleable asset.

Momentum is therefore a vector, not one return: more marketable wealth, more use value, more income, more collateral or some combination.

PART V

Matched descendants

PART V: Matched descendants

The forty-year result

GREYSCIENX / MATCHED DESCENDANTS

The same descendant can finish with very different wealth

Matched earnings, education, household size and saving. Marketable net worth in constant 2024 rand.

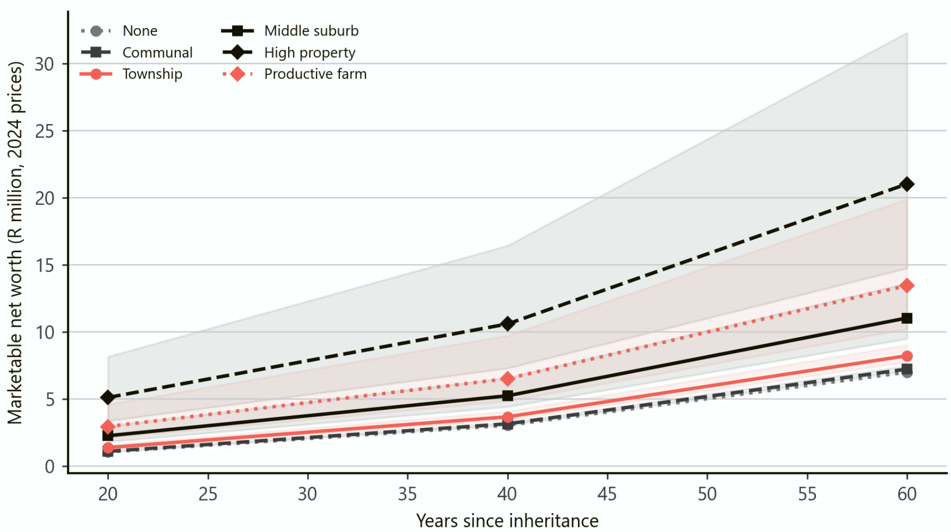

Figure 3. Lines show medians; faint bands show the interquartile range. The no-property line has no modeled property uncertainty. All descendants have the same salary and saving behavior.

Inherited condition	20-year median	40-year median	60-year median	40-year middle 50%
No property	R1.05m	R3.04m	R7.00m	R3.04m-R3.04m
Communal residence	R1.10m	R3.15m	R7.23m	R3.10m-R3.25m
Titled township home	R1.38m	R3.67m	R8.22m	R3.44m-R4.07m
Middle suburban home	R2.26m	R5.24m	R11.03m	R4.42m-R6.58m
High property or portfolio	R5.11m	R10.59m	R21.02m	R7.29m-R16.43m
Productive farm	R2.94m	R6.51m	R13.46m	R4.85m-R9.73m

The baseline descendant accumulates meaningful wealth. That is important. The model is not designed so that wages “cannot matter.” A regular real salary, an 8% saving rate and patient investment reach R3.04 million after forty years. Inheritance changes the starting balance sheet and adds services; it does not replace work.

At twenty years, 24% of middle-suburb descendants, 81% of high-property descendants and 49% of farm descendants exceed R3 million. None of the no-property, communal or township central cases crosses that threshold because the common baseline is about R1.05 million at that date.

At forty years, 4% of middle-suburb draws, 54% of high-property draws and 24% of farm draws exceed R10 million. The township distribution remains below R10 million in essentially all draws at forty years, but 12% crosses R10 million by sixty years. Thresholds illustrate timing as well as level.

The distributions overlap

GREYSCIENX / WITHIN-SCENARIO HETEROGENEITY

The distributions overlap; property type does not determine

Forty-year marketable net worth. Violin width shows density; white dot is the median.

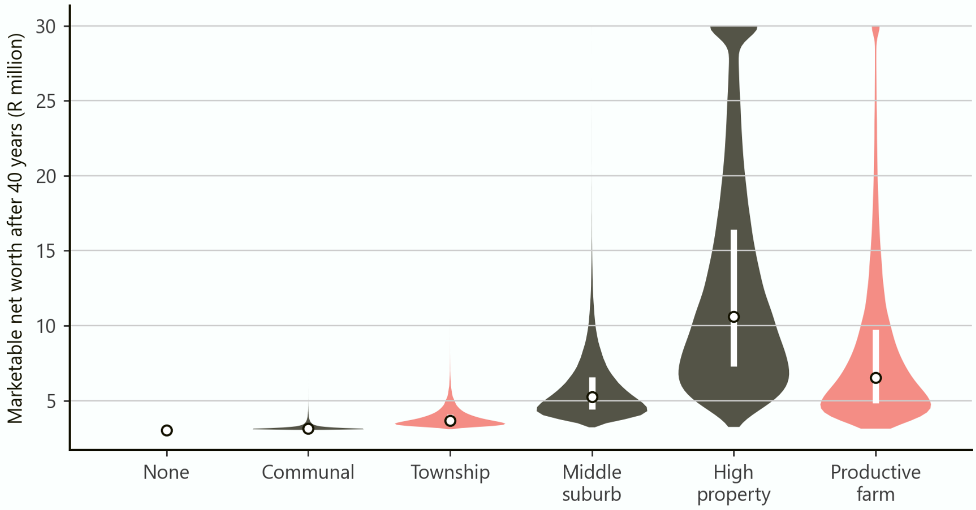

Figure 4. Property type shifts the distribution; it does not fix the outcome. Values above R30 million are clipped in the figure, not in the model results.

The middle half of the township distribution after forty years is R3.44-R4.07 million. The bottom quarter of the middle-suburb distribution extends below R4.42 million. The two distributions almost meet even before tails are considered. A heavily divided suburban asset can resemble a strong township inheritance; a high-property asset with many heirs can fall into the range of a productive farm.

This overlap is the reason the paper refuses to infer individual wealth from population group. Group averages can reveal institutional history while performing badly as personal predictions.

Which channels create the dividend?

GREYSCIENX / CHANNEL DECOMPOSITION

Market value is only one part of the inheritance dividend

Mean incremental value at 40 years; same earnings-and-saving baseline removed.

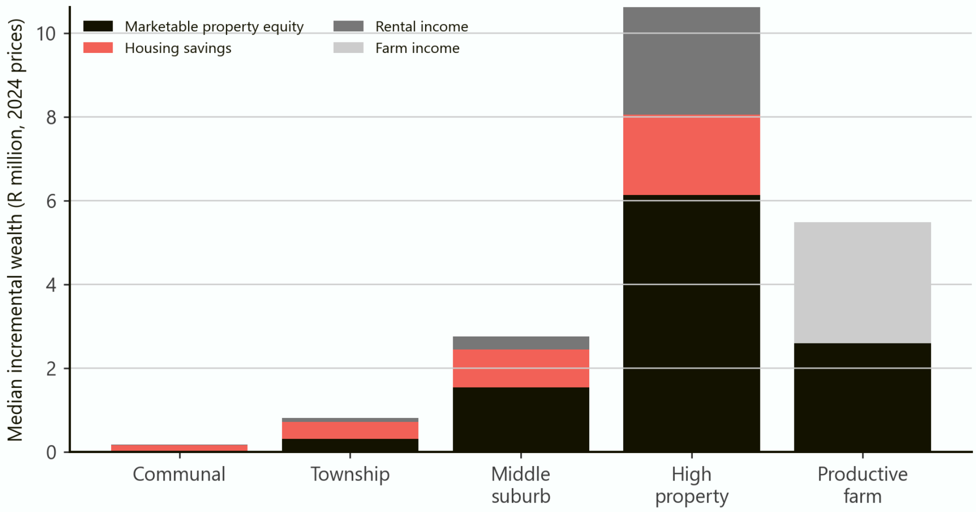

Figure 5. Mean components are shown because mean channel contributions add arithmetically. They should be read beside the median distributions, which are less sensitive to the upper tail.

Property condition	Marketable equity	Reinvested housing savings	Reinvested rent	Reinvested farm income
Communal residence	R0.03m	R0.14m	R0.01m	-
Titled township home	R0.32m	R0.40m	R0.10m	-
Middle suburban home	R1.54m	R0.91m	R0.30m	-
High property or portfolio	R6.14m	R1.91m	R2.56m	-
Productive farm	R2.59m	-	-	R2.89m

These are mean incremental components at forty years, not medians and not additive to the median table. Equity dominates high-value property. Housing savings matter most for owner-occupied homes. Rental income becomes powerful only when a property is both rentable and retained. In the farm case, productive income is as important as land equity.

The decomposition also clarifies a common mistake. Avoided rent is not free cash equal to a gross rental yield. The property must be maintained; several heirs may share use; some of the benefit is consumed; and occupation prevents simultaneous rental of the same space. The model enforces those trade-offs.

Collateral is an option, not cash

The OECD observes that immovable property can provide collateral for young firms with short credit histories, conditional on clear rights and timely recovery. CAHF shows that mortgage participation rises sharply across housing-value segments. These sources establish plausibility, not a causal return. In the extended model, opportunity use occurs in 4% of communal, 10% of township, 16% of middle-suburb, 24% of high-property and 22% of farm draws; average forty-year gains remain modest at roughly R0.00m, R0.01m, R0.04m, R0.06m and R0.05m. Losses remain possible. OECD Economic Survey 2022.

PART VI

From group evidence to a synthetic intake distribution

PART VI: From group evidence to a synthetic intake distribution

The most uncertain part of the exercise

The brief asks for a distribution of inherited property by population group and property type. No national dataset observes it. The model therefore builds an **evidence-constrained synthetic intake distribution**. It uses receipt-probability ranges below probate estate-to-death ratios, broad type mixtures informed by estate geography and property markets, and additional division among claimants. Every output in this section is modeled.

The central modeled probabilities of receiving some property claim are 21% for Black African descendants, 31% for Coloured descendants, 42% for Indian or Asian descendants and 67% for White descendants. These are not survey estimates. They are deliberately lower than the corresponding any-estate ratios because a decedent estate is not the same as a material receipt by a particular descendant.

Conditional type weights are also assumptions. The Black African mixture assigns 30% to communal residence, 38% to titled township property, 20% to middle suburban property, 4% to high property and 8% to farms. The White mixture assigns 1%, 3%, 48%, 32% and 16%. The Coloured and Indian or Asian mixtures lie between in different ways. The file `parameters.csv` discloses every weight.

GREYSCIENX / EVIDENCE-CONSTRAINED SCENARIO

Group-conditioned scenarios still contain wide overlap

Synthetic liquid-equivalent inheritance distributions; zeros included. These are not observed group means.

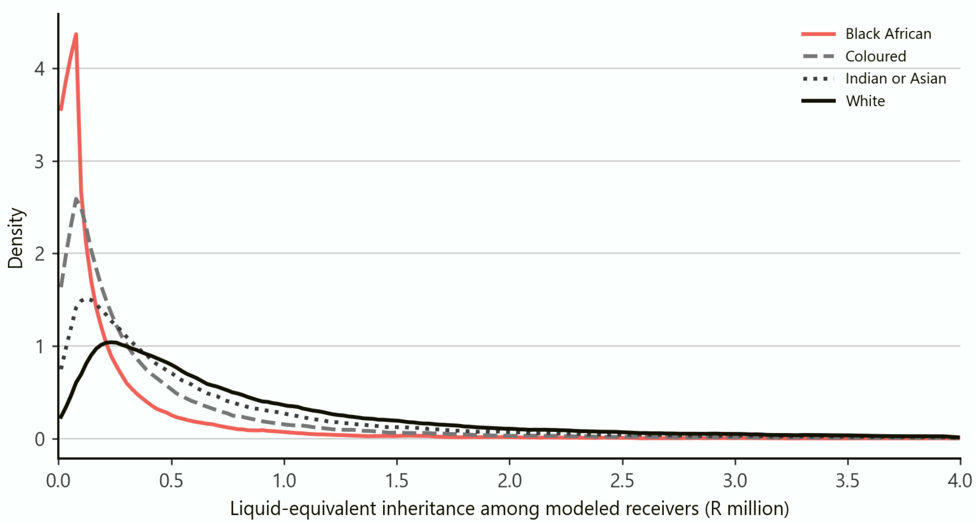

Figure 6. Curves include only modeled receivers so their overlap is visible; unconditional distributions contain many zeros. The scenarios describe aggregate historical sorting and are not observed group means.

Population-group scenario	Modeled any-property receipt	Receiver median liquid equivalent	All descendants above R250,000
Black African	21%	R70,000	5%
Coloured	31%	R217,000	14%
Indian or Asian	42%	R410,000	28%
White	67%	R644,000	54%

The unconditional median is zero in the Black African, Coloured, and Indian or Asian scenarios because more than half receive no modeled property. It is about R317,000 in the White scenario. Means are higher because of a long upper tail.

These outputs are best read as a stress test. If the receipt and type mixtures were wrong, the numbers would move. The model's contribution is to show exactly where judgment enters, not to disguise a judgmental calibration as a survey estimate.

Why not assign the probate percentages directly?

The probate threshold describes adults holding wealth at a point in time, reconstructed from deaths. Receipt is a flow to an heir. A parent can leave one estate to several children; a spouse may inherit first; property can remain undivided; an heir can sell or lose the asset before a survey; and a person can hold wealth built from earnings without ever receiving a bequest. The concepts overlap without being interchangeable.

The model therefore uses the formal-wealth thresholds as a diagnostic check, not as receiver probabilities. The synthetic Black African scenario produces 5% of all descendants above R250,000 in liquid-equivalent inherited value, close to the NIDS estimate excluding possessions but above the 3% probate estimate. The other scenarios do not fit every threshold exactly and should not be read as calibrated forecasts.

Informal inheritance can narrow the measured gap while preserving the financial gap

If Black and Coloured families transfer more homes outside formal administration than probate records show, true inheritance incidence is higher than probate. That would narrow the incidence gap. But if those transfers have disputed title, several claimants or weak sale and mortgage markets, the liquid-equivalent gap can remain large.

This is why correcting underreporting does not automatically equalise economic function. It can reveal more use value while leaving collateral and marketability unequal.

PART VII

Agricultural property

PART VII: Agricultural property

The land audit does not say what popular summaries say it says

The 2017 Land Audit reports that 114.2 million hectares were registered in the Deeds Office. Individuals, companies, trusts, community-based organisations and co-owners held different shares. Only holdings registered to identifiable private individuals could be classified by population group.

Within the 37.0 million hectares of farms and agricultural holdings owned by individuals, White individuals held 72%, Coloured individuals 15%, Indian individuals 5%, African individuals 4%, other 3% and co-owners 1%. These percentages are often repeated as if they describe all South African land. They do not include the full land held through companies, trusts, institutions, community organisations, the state or unregistered communal systems. Department of Rural Development and Land Reform, Land Audit 2017.

The audit also reports 181,532 individual owners of farms and agricultural holdings: 53% White, 22% African, 12% Coloured, 9% Indian and 4% other. Owner counts and hectare shares answer different questions because farm size varies dramatically.

The Census of Commercial Agriculture counted 40,122 commercial farming units using 46.4 million hectares and earning R332.8 billion in gross income in 2017. Seventy-seven per cent of land used by those units was farmer-owned. Gross industry income is not profit, land value or inheritance. The census excludes much household and communal production. Statistics South Africa, Commercial Agriculture 2017.

Same land, different operating system

The agricultural model gives every scenario the same R2.5 million starting land resource and a twenty-year horizon. It then crosses tenure with productive conditions.

Communal / rain-fed: a family or community has real use rights and social value, but low individual sale and collateral in the central case, limited water and little operating capital.

Communal / water and capital: tenure remains collective or customary, but reliable water, infrastructure and operating capital raise productive income.

Freehold / rain-fed: title improves marketability and collateral, but production remains constrained.

Freehold / water and capital: title, water, infrastructure and finance operate together.

This is not an argument that communal tenure should simply be converted into individual freehold. Communal systems can provide legitimate, secure and flexible rights that private-title analogies miss. The comparison isolates economic functions while preserving broader resource value. Clark and Luwaya (2017).

GREYSCIENX / AGRICULTURAL PROPERTY MODULE

The same hectares can transfer different economic capacity

Identical R2.5m starting land value; twenty-year medians and interquartile ranges, constant 2024 rand.

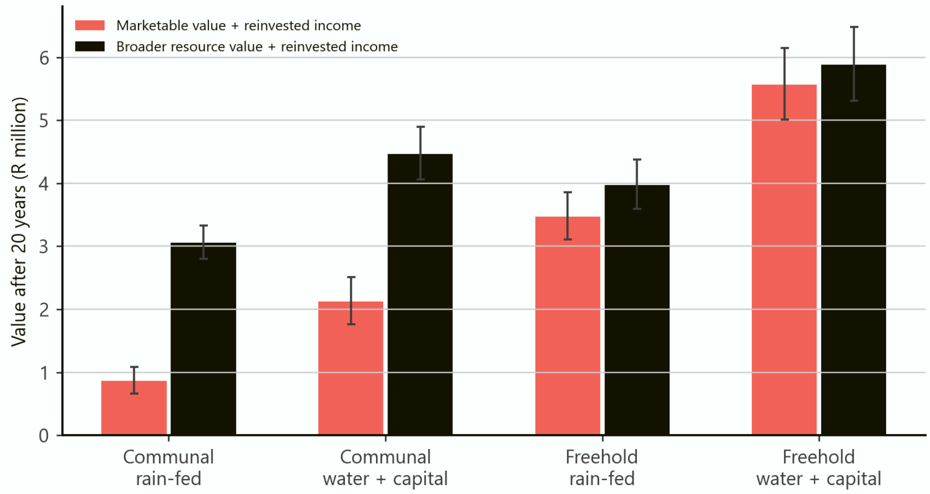

Figure 7. Marketable value applies a title and marketability factor; broader resource value retains the underlying land resource. Both add reinvested productive income. Neither prices social or customary value.

Agricultural condition	20-year marketable median	20-year broader resource median	Initial collateral capacity	Reinvested income median
Communal / rain-fed	R0.87m	R3.06m	R0.00m	R0.43m
Communal / water + capital	R2.12m	R4.47m	R0.02m	R1.49m
Freehold / rain-fed	R3.47m	R3.97m	R0.73m	R0.84m
Freehold / water + capital	R5.56m	R5.88m	R1.09m	R2.23m

The comparisons separate two effects. Moving from communal/rain-fed to communal/water-and-capital raises the marketable median by R1.25 million mainly through productive income. Moving from communal/rain-fed to freehold/rain-fed raises it by R2.61 million mainly through saleability and collateral. Combining the packages produces the largest result.

Recent research on farms acquired through the Proactive Land Acquisition Strategy finds that size, location, water rights and extension access are associated with prices; fewer than 20% of beneficiaries in that sample had water rights. Financier research finds market comparables and income capitalisation central to agricultural valuation. Neither source estimates the causal effect used in this model, so the parameter ranges remain scenarios. Zantsi et al. (2025); Middelberg (2014).

A farm is an enterprise, not just a field

Agricultural inheritance can transfer land, improvements, water, irrigation, machinery, biological assets, operating capital, supplier credit, market relationships, production knowledge and a legal entity capable of contracting. An heir receiving hectares without that bundle may inherit a home, grazing, food production and identity while receiving little scalable enterprise capacity. An heir receiving the bundle can inherit an operating firm. Racial attribution based only on hectares cannot capture that difference.

PART VIII

What interrupts compounding?

PART VIII: What interrupts compounding?

The house can be rich and the heirs cash-poor

An indivisible home inherited by several people creates a coordination problem. One heir may occupy it, another may pay rates, a third may want rent and a fourth may want sale. The asset can provide valuable shelter while producing no distributable cash. If one heir buys out the others, that heir needs finance; if the property cannot be mortgaged, the family may be trapped between co-ownership and informal sale.

Simson and Mahmoudzadeh note that larger average family size can divide inheritances among more heirs, while formal title transfer and family contestation can slow conversion into market wealth. Bolt's fieldwork shows why “the family house” can express collective obligation that does not fit an individualised estate process. Bolt (2021).

The model makes division visible but cannot represent every kinship arrangement. It assumes a claim divisor, not a legal judgment about rightful ownership.

Title backlogs have a balance-sheet cost

CAHF estimates that 2.183 million registered residential properties were government-subsidised in 2023, 32% of the registered stock. It notes that including the large title-deed backlog would raise the government-subsidised share to 43%. A house can therefore be physically delivered and socially occupied before its registered asset function is complete.

The cost of delay is not only a missed sale. It can include:

- inability to mortgage or formally lease;
- uncertainty over maintenance responsibility;
- weaker protection in a family dispute;
- exclusion from a buyer's mortgage-financed demand; and
- another succession occurring before the first transfer is complete.

These costs are uneven but not necessarily permanent. Formalisation can unlock options while also sharpening conflicts over who is excluded.

Debt and upkeep travel with the asset

Inherited property may carry a mortgage, municipal arrears, rates, taxes, insurance and deferred maintenance. A high-value home can force a sale if the heir cannot fund carrying costs. A farm can require seasonal working capital before generating revenue. The model subtracts inherited debt and maintenance; it does not assume gross value arrives as cash.

The South African Reserve Bank notes that property prices affect both household balance sheets and banks' recovery when borrowers default. Collateral amplifies upside and downside. SARB (2023).

Early help may matter more than a late bequest

Deposit help, tuition, accommodation near work, a loan guarantee and use of family property can transfer capacity before the donor dies. Probate sees none of these if they leave no estate trace, and NIDS does not identify the property base that enabled them. Timing matters: a R200,000 deposit at thirty can advance market entry, while the same amount at seventy mainly strengthens retirement. The linked data required for a national value do not exist, so the model omits this likely source of additional momentum.

PART IX
How much of the wealth gap?

PART IX: How much of the wealth gap?

A decomposition that the data do not yet permit

To estimate the causal share of the racial wealth gap explained by inherited property, a researcher would need to observe or credibly instrument:

- whether property was received and when;
- its gross value and debt at receipt;
- tenure, title and claimants;
- exact location and services;
- realised rent, sale and appreciation;
- collateral use and loan terms;
- descendant education, earnings, household formation and saving before and after receipt; and
- transfers onward to the next generation.

No current national source contains that set. Linking deeds, deceased-estate administration, tax, credit, municipal valuation and longitudinal household surveys would create enormous privacy and classification challenges. Without it, a single percentage would be model confidence masquerading as evidence.

What the scale comparison does establish

The matched model creates the following forty-year gaps while earnings and saving remain equal:

Comparison	Median wealth difference after 40 years
Township home vs no property	R0.63m
Middle suburb vs township home	R1.57m
High property vs middle suburb	R5.35m
Productive farm vs no property	R3.47m
High property vs communal residence	R7.44m

The observed 2017 median Black-White household wealth difference was about R1.295 million. The model's middle-suburb versus township difference is slightly larger. This does **not** mean property inheritance explains more than 100% of the observed gap. The objects differ in year, household unit, age, currency basis and wealth concept. The comparison says that plausible property bundles have sufficient magnitude to be a first-order mechanism.

The lower scenario matters too. The communal-residence case adds only R0.11 million to median marketable net worth after forty years, even while providing housing use. If many transfers are off-register, divided and illiquid, inheritance incidence can rise without closing the formal wealth gap.

Could the mechanism be smaller?

Yes. It would be smaller if:

- real appreciation converges across locations;
- inherited properties are sold and proceeds consumed;
- maintenance and municipal costs are higher;
- rents cannot be collected or are shared widely;
- heirs divide equity among more claimants;
- earnings and saving dominate the inherited starting point; or
- currently unrecorded communal and township transfers are more valuable and marketable than the model assumes.

Could it be larger?

Yes. It would be larger if:

- early deposit assistance advances first purchase by many years;
- high-opportunity locations appreciate faster for long periods;
- family property insures unemployment and prevents expensive debt;
- collateral finances successful education or enterprise;
- rental portfolios transfer intact through legal entities; or
- spatial access raises earnings, a channel deliberately held constant in the matched model.

The model's central result is not a midpoint between truth and error. It is one disclosed scenario inside a wide identification region.

GREYSCIENX / SENSITIVITY

Appreciation and heir division drive the widest sensitivity

One-at-a-time change from a middle-suburb central case at 40 years; illustrative, not a forecast interval.

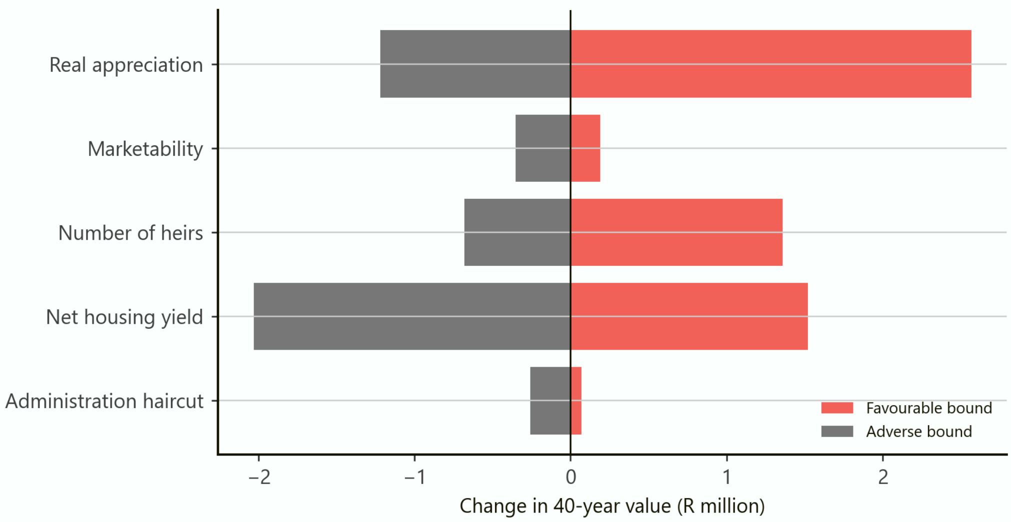

Figure 8. One-at-a-time sensitivity around the middle-suburb central case. Appreciation and division among heirs have the largest forty-year effects. The chart is an assumption diagnostic, not a confidence interval.

PART X

Policy implications

PART X: Policy implications

Convert shelter into optionality without converting every right into a commodity

The policy objective should not be to force every family home into sale. It should be to expand the options attached to secure occupation.

For titled urban property, that means completing transfers, clearing deceased-estate bottlenecks, resolving municipal records, supporting low-cost conveyancing and making small mortgages viable. For customary and communal systems, it means legally recording and protecting rights in forms that respect collective governance rather than assuming individual freehold is the only secure tenure.

The distinction matters. A reform that raises collateral but enables dispossession after a failed loan may reduce family security. A reform that protects occupation but forbids every lease, partnership or inheritance record may preserve use while blocking productive choice. Good tenure policy expands a menu of enforceable rights and duties.

Treat location as part of housing value

Housing policy counts units easily. It should also count access.

A housing asset's economic performance should be evaluated against:

- travel time to employment;
- transport cost and reliability;
- school and health access;
- water, sanitation, electricity and refuse services;
- transaction volumes and mortgage participation;
- rental demand and vacancy; and
- municipal fiscal and administrative capacity.

A peripheral subsidised house may be a major welfare gain and a weak wealth-building asset at the same time. That is not a reason to withhold housing. It is a reason to stop treating a key handover as the end of spatial policy.

Make low-value markets cheaper to transact

CAHF's data show that mortgage participation is particularly weak below R300,000 and much stronger above R600,000. Fixed valuation, legal, registration and origination costs loom large on a small transaction. Policy can improve market depth through standardised records, small-loan products, efficient foreclosure safeguards, shared-equity structures, title insurance or guarantees, and better municipal information.

Market deepening must protect occupants. Faster saleability can help heirs realise value; it can also expose distressed households to predatory acquisition. Consumer protection and independent advice are part of liquidity infrastructure.

Separate land transfer from farm viability

Agricultural policy should report at least four ledgers:

1. hectares and legal rights transferred;
2. water, infrastructure and equipment transferred;
3. operating capital and market access supplied; and
4. net farm income sustained after support.

Title is important to finance but insufficient to farm viability. Water without secure governance can fail; title without cash flow can become collateral for a loan the farm cannot service; communal tenure with good infrastructure can support production without individual sale rights.

Build an inheritance data spine

South Africa needs a privacy-preserving statistical system that links, at aggregate or secure-research level:

- deeds and title changes;
- Master's Office estate milestones;
- municipal valuations and arrears;
- mortgage originations and releases;
- Census and survey settlement type;
- tax-recorded donations and estates; and
- longitudinal outcomes for heirs.

The system should record the basis of population-group classification, allow self-identification where appropriate, and publish uncertainty. It should never become a public racial property register.

Measure control as well as household ownership

Household wealth statistics should distinguish the person who owns, decides, receives income, carries debt and expects to inherit. This is essential for gender analysis and for family property with several claimants. A household total is useful for material living standards and insufficient for power.

PART XI

Limits and falsification

PART XI: Limits and falsification

What would change the conclusion?

The finding that inherited property geography has material momentum would weaken if linked data showed that:

- receipt probabilities and property types were similar across groups after age and location adjustment;
- appreciation, rent, marketability and collateral did not differ meaningfully across inherited locations;
- inherited property was usually divided or consumed before it affected descendant wealth;
- inter vivos support was equally available across initial property conditions; or
- descendants without property systematically saved enough more to erase the initial difference.

The conclusion would strengthen if linked data showed that property type predicts later wealth after credible controls or quasi-experimental variation, particularly through earlier home purchase, avoided rent, credit access or geographic mobility.

Specific limitations

Survivorship and mortality selection. Probate observes deaths. Mortality differs by age, sex, income and population group. Mortality multipliers cannot remove every socioeconomic gradient.

Reporting selection. Two-thirds of estates may go unreported according to administrative evidence cited in Bolt's research. The missing share is not random.

Name classification. Probate research infers population group from names. Some names cannot distinguish White and Coloured identities; classification uncertainty enters maps and shares.

Survey valuation. Owners may misstate or omit house value. NIDS housing aggregates can exceed macro balance-sheet estimates while financial assets are severely undercovered.

Top-tail omission. Household surveys miss extremely wealthy people. A median is robust to the far top but total wealth shares and high-property distributions are not.

Deeds omission. Registered-market data exclude informal dwellings, backyard units, off-register claims and title-backlog houses.

Price-year mismatch. Evidence spans 2008-2026. The model uses constant 2024 rand and does not pretend every historical threshold has been perfectly harmonised.

Independence. Model draws often treat risks independently. In reality weak title, remote location, poor services and thin markets cluster. The model may understate compounding disadvantage.

Policy and climate. Sixty years is long enough for laws, transport, municipal quality, climate and neighbourhoods to change radically. A sixty-year scenario is a compounding illustration, not a forecast.

Race and personhood. Population-group averages do not determine individual property, income, conduct or destiny. The model must not be used for credit, valuation, screening or personal inference.

PART XII

Final answer

PART XII: Final answer

The geography is still compounding, but not through one price

Apartheid's property legacy persists because land and housing carry institutional memory. A property remembers where roads, schools, sewers, jobs and credit were placed. A title remembers who could register ownership. A market remembers which buyers arrived with deposits and which neighbourhoods banks learned to finance. A family remembers who may live in the house, who paid for it and who must be protected from sale.

The evidence shows a large formal wealth gap, a racially stratified geography of estate-leavers, unequal housing submarkets and sharply incomplete coverage of communal and informal wealth. The model shows that those differences are large enough to compound into lifetime wealth gaps even when descendants are matched on education, salary, household size and saving.

It also shows why "property wealth" is an inadequate phrase unless the property bundle is specified. A communal residence can transfer security without liquidity. A township house can be valuable without matching the appreciation and mortgage reach of an affluent suburb. A farm can transfer hectares without water, or an operating enterprise with it. A portfolio can generate rent and collateral before a descendant earns a salary.

The national causal share remains unidentified. The responsible answer is therefore neither "property explains everything" nor "the data prove nothing." It is this:

Inherited geography is a credible, observable and quantitatively first-order mechanism. In central matched scenarios, the forty-year difference between a titled township home and a middle suburban home is R1.57 million, while the difference between a communal residence and high-value property is R7.44 million. These magnitudes can reproduce or exceed the order of the observed median racial wealth gap, but current data cannot say what fraction they caused.

Thirty years after the laws changed, property geography retains momentum through value, use, liquidity, leverage and time. Ending the legal allocation did not reset the balance sheet. It only stopped one mechanism from adding new entries in the old handwriting.

APPENDIX

Model reading guide

APPENDIX: Model reading guide

Central assumptions

Item	Central value	Interpretation
Draws per scenario	100,000	Monte Carlo sample, fixed seed
Real salary	R420,000/year	Matched control, not population estimate
Saving rate	8%	Matched control
Financial real return	3.5%	Central reinvestment return
Inheritance horizons	20, 40, 60 years	Compounding intervals
Initial liquid wealth	R50,000	Same in every matched case
Price basis	2024 rand	Real, not nominal projections

Full low, mode and high parameters appear in `parameters.csv`.

Output definitions

Marketable net worth equals the common financial baseline plus marketability-adjusted property equity and reinvested housing, rental or productive income.

Broader resource value replaces marketability-adjusted equity with the heir's full modeled property resource. It does not include a monetary value for identity, ancestry or social belonging.

Liquid-equivalent inheritance is debt- and administration-adjusted inherited equity multiplied by marketability at receipt.

Opportunity gain is the net result of an optional collateral-backed investment after financing costs and possible loss. It is not counted in the headline matched result.

Reproducibility

The deterministic model, inputs, outputs, citation ledger and source notes are published with the manuscript. Re-running `model.py` regenerates all numerical figures and tables except narrative evidence tables transcribed from cited sources.

SECTION

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