Policy Instability and the Risk-Return Trade-Off

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Abstract

What is the impact of large swings in economic policy on the risk-return trade-off faced by i nvestors? What is the impact of changes in policy regimes on investment strategies? In this paper we study the impact on returns of switches between periods of market-friendly economic policies and periods of populist policies. To quantify the impact of policy instability, we use data from Argentina—a country that has experienced frequent and very large regime changes—and find that the risk-return for individual assets and minimum variance portfolios are quite different across regimes. We then develop a dynamic model to understand optimal portfolios when investors are cognizant that regimes can change. We find that when portfolios are unrestricted, it is optimal for investors to take a large amount of risk. On the other hand, when portfolios are restricted to include only long positions, a real asset (real estate) dominates financial assets.

JEL codes: E44, G11, G12

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1. INTRODUCTION

Over the last few years, many countries have adopted economic policies that can be broadly defined as populist. Typically, these policies include different forms of interventions that disrupt market mechanisms.[1] The impact of a given policy is determined by, not only its features, but also its stability. Policy regimes that change very frequently create uncertainty and negatively affect investment decisions.[2] The historical records of many Latin American economies show that many have experienced frequent switches between (relatively) market-friendly and populist regimes, and some view these changes as imposing significant costs.[3]

A country's economic performance depends crucially on its ability to direct savings to the most productive uses. Economic policies have a large impact on how investors choose to allocate their savings. In this paper we document how the risk-return trade-off faced by an investor changes with the policy regime and we

1. For a discussion, see Edwards (2019).

2. The negative effects of high uncertainty on economic performance have been studied by Bloom (2009, 2014) and Bloom et al. (2018), among others. In particular, the effects of policy uncertainty have been documented by Boutchkova et al. (2012), Fernandez-Villaverde et al. (2015), and Baker, Bloom, and Davis (2016). While these studies focus mainly on the U.S. economy, others focus on small open economies. For example, Fernandez-Villaverde et al. (2011) document that interest rate volatility at which small open economies borrow can trigger a contraction in output, consumption, and investment.

3. In the Latin American context, see Dornbusch and Edwards (1991). Edwards (2019) draws lessons from Latin America for the rest of the world. Hopkin and Blyth (2019) discuss the impact of populism in Eastern Europe. Rodrik (2018) discusses the interplay between globalization and populism. In a series of papers edited by Kehoe and Nicolini (2022), several authors study the structural changes and economic performances of many Latin American countries in the last six decades.

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illustrate how portfolios that perform well in one regime can generate large losses when the regime changes. We then develop a model of dynamic portfolio selection to study how a rational investor should choose his portfolio, accounting for the possibility of regime changes and the costs—both in terms of time and resources—of adjusting the portfolio.

To illustrate the forces at work, we study the impact of policy instability in Argentina, a country characterized by frequent and dramatic swings in economic policies. We use monthly data on the *real* returns on a collection of assets that include time deposits (both fixed and adjustable rate), real estate, and foreign exchange (U.S. dollar) at both the official exchange rate—which is typically controlled by the government during populist periods—and the black market rate that is easily accessible to individual investors. The sample period is from 1981 to 2019 and includes four populist periods and three market periods.

We find that the risk-return trade-off using the full sample—which corresponds to the appropriate approach if one ignores regime changes—is very misleading of the actual options available to investors. If we allow for unrestricted portfolios—that is, portfolios in which some assets can be shorted—the minimum variance frontier during market periods uniformly dominates that of populist periods. This means that for a given riskiness of the portfolio, expected returns are higher during the market regime.

This finding, somewhat surprisingly, depends crucially on the assumption that the investor can go short in some assets. In the case of Argentina, the returns on investing in foreign exchange are negative during market periods and positive during populist periods. Thus, a policy of contracting debts in U.S. dollars during market periods is behind the large returns of the optimal portfolio. This result is roughly consistent with the observation that Argentina has, in the past, significantly increased borrowing in foreign currency during market periods. It also shows that high returns are associated with leverage and the regime-dependent returns encourage even risk-averse investors to take significant risk by highly leveraging their portfolios.

To capture the trade-offs faced by investors that cannot short any asset, we compute the minimum variance frontier, imposing the restriction that no asset can be used to borrow to finance long positions. The results are radically different. Two extreme observations give a good sense of the differences. First, the safest (lowest variance) portfolio that can be constructed using returns during the populist period has a level of risk—as measured by the standard deviation of the returns—that is about 50 percent higher than the riskiest portfolio during the market period. Second, the highest expected return that is possible to attain in the market regime falls short of 9 percent, while the portfolio with the highest expected return in the populist period earns over 60 percent per year.

To better understand optimal investment decisions, we develop a dynamic portfolio choice model. We consider a long-lived investor who understands that regime changes are stochastic and that it is costly—both in terms of time and resources—to adjust a portfolio. We consider several scenarios and find that the composition of the optimal portfolio depends, crucially, on whether assets can be shorted or not. In the case that the investor can borrow, they take advantage of this possibility by creating high return-high risk portfolios during market regimes by borrowing in foreign exchange and investing in domestic real estate. The negative positions are undone during populist regimes to reduce the riskiness of the portfolio, but investments in real estate are still a major component.

These large differences in the composition of the optimal portfolios are a reflection of the large differences in returns across policy regimes. These differences imply that a fixed portfolio, apart from one invested in real estate, that performs well in one regime can earn poor returns upon a regime change.

A more general, although somewhat speculative, message from our exercise is that policy instability that is associated with increased uncertainty will generally induce large changes in positions and hence in the price of different assets. Even though Argentina is an extreme example of poor and unstable policy, it is a perfect laboratory to study the potential costs of instability as they appear to be large.

The rest of the article is as follows. Section 2 briefly describes the major features associated with populist and market-friendly policies. Section 3 describes the risk-return trade-offs across policy regimes. Section 4 develops a dynamic model of optimal portfolio choice and illustrates—using data from Argentina—the impact of regime changes on the allocation of wealth across assets. Section 5 concludes.

2. ARGENTINA: POPULIST AND MARKET-FRIENDLY REGIMES

Simon Kuznets is said to have remarked that there were four types of countries: developed, developing, Japan, and Argentina. If Kuznets were writing today, he would probably subtract Japan from that list as its economic performance can be readily understood using standard models. However, Argentina, a country characterized by an above-average endowment of natural resources and a relatively high endowment of human capital, remains a puzzle (and interesting case study) due to its frequent and large policy changes and poor performance.

It is impossible to summarize the economic history of Argentina since 1980 in a few paragraphs.[4] At a general level, the economic policies implemented in the last 100 years alternate between a version of *populism*[5] and more market-friendly policies. It is misleading to believe that, within a regime, policies are stable. Typically, the first few months of the pro-market regime are devoted to undoing the regulations and fixing the distortions inherited from the populist regime. Similarly, a populist regime spends the first few months creating the institutional framework to implement its preferred policies.

There is no agreement on what constitutes a populist economic policy. Edwards (2019) distinguishes between *classical* and *new* populism. He views most populist experiments in Latin America before 1990 as being of the classical variety that relies on heterodox macroeconomic policies. New populism emphasizes "blanket regulations, deep protectionist policies, large expansions of the public sector, and mandated minimum wage increases"(Edwards 2019). However, given that our interest is in the relationship between policies and portfolio choices, it is useful to describe some features of both policy regimes that directly influence asset returns and, consequently, optimal portfolios.

Populist economic policies typically include (especially in the latter stages) the following:

- Exchange rate and capital mobility controls
- Significant regulation of financial intermediaries, including caps on yields and quantitative restrictions
- Use of extreme adjustment (or unorthodox taxation) mechanisms (confiscation of assets either through mispriced mandatory exchanges or inflation)
- High taxes on the formal sector (which promote informality)
- Price controls, including rents

From the perspective of an investor choosing his portfolio, there are two important features. First, price (or rate of return) controls and regulations that require some economic agents to invest in those assets as part of their economic activity distorts portfolio choices and rates of return. Some assets might display a "convenience yield" if they provide a way of bypassing costly regulations. The returns of other assets might reflect the existence of, for want of a better word, a "convenience tax," which is the case when holding these assets exposes the investor to some form of penalty. This includes assets that have low liquidity (e.g., real estate) as well as assets that expose investors to risk (black market operations in foreign exchange).

Second, during periods of populist policies, governments have resorted to a variety of actions that are tantamount to expropriation. Examples of this type of policy include exchanging at par bank deposits for government bonds whose market price was about 30 percent of their par value, episodes of hyperinflation that amount to a tax on nominal assets, and "unilaterally rewriting contracts in U.S. dollars in depreciated pesos, imposing huge losses to investors and international firms"(Edwards 2019, 95).

Some of the main features of market-friendly policies are the following:

- Elimination of many regulations and controls
- Minimal restrictions on capital mobility and restrictions on portfolios (e.g., allowing portfolios to include assets denominated in foreign currency)
- Low probability of expropriation

In a market-friendly regime, the standard approach to asset pricing should yield a better fit conditional on the regime. However, since regime changes are rightfully viewed as random events, the pricing equation has to take that into account.

To make progress on understanding asset valuation, we use the sample in Mosquera and Sturzenegger (2020), which contains data on returns on a variety of assets for the period 1981-2019, and split it into two subsamples according to the policy regime. As mentioned above, there is no uncontroversial procedure for determining whether a particular policy is populist or market friendly. We use the following criteria:

- Market regime: This includes the period during which Argentina followed a traditional monetary policy with a constant exchange rate from April 1991 to November 2001; December 2002 to March 2011, during which there were few restrictions on asset transactions; and January 2016 to August 2019, when the Macri government liberalized the economy and did not impose exchange controls.
- Populist regime: This consists of the rest of the sample.

4. Recent short summaries of the economic history of Argentina include Buera and Nicolini (2019) and the various papers that appeared in the December 2018 issue of the *Latin American Review*. A good summary of the economic outcomes can be found in the introduction of Glaeser et al. (2018). See also Cavallo and Cavallo Runde (2018) and Della Paolera and Taylor (2003). De Pablo (2019) (in Spanish) discusses the difficulties of designing economic policy in Argentina.

5. See Dornbush and Edwards (1991) for traditional populism and Edwards (2019) for the new populism as applied to Latin America.

Table 1
Monthly Growth Rates (%)

	Real wage		Prices	
Regime	Mean	St. dev.	Mean	St. dev.
Full sample	0.121	3.55	5.37	13.92
Populist	0.010	5.30	13.63	20.12
Market	0.200	1.40	1.03	1.34

It is clear that there is a fair amount of policy heterogeneity within each of these phases. However, to preserve degrees of freedom, we ignore the within-regime differences.[6]

In this article we present results on the real returns of a collection of assets, and we discuss the evidence from the perspective of a standard asset pricing model. The set of assets that we consider include the following:

- Time deposits (CD): These are regular time deposits (the minimum term varies greatly over time, but they could be as short as 7 days and as long as a year). We use the 30-day CD rate. The interest is set in nominal terms, but the returns are deflated by a measure of inflation using the consumer price index (CPI).
- Adjustable bank deposits (UVA): Interest paid is adjusted using a formula that, effectively, is a distributed lag of the inflation rate during the previous two months. The resulting nominal rate is deflated using the CPI.
- Real estate (RE): The return is an index of the change in house prices and an allocation for the monthly value of a lease.
- U$S dollar (U$S): This is the real return in pesos of holding non-interest earning dollars valued at the "official" (legal) exchange rate. Thus if the peso-dollar exchange rate is denoted as S_t (pesos per dollar), then the return is computed as
$$e^{r_{Dt}} = \frac{S_t/S_{t-1}}{P_t/P_{t-1}},$$
where P_t is a measure of the aggregate price index.
- U$S dollar "blue" (B): It is also the return from holding U$S dollars except we use the black market exchange rate instead of the official exchange rate. Even though there are some costs associated with exchanging dollars at this rate, it is relatively easy for middle-class Argentinians (but not necessarily for low-income households) to access this informal market.
- The data are monthly and have not been seasonally adjusted.

From the perspective of the U.S., it might be surprising that we exclude investments in some form of security that tracks the overall value of the stock market. However, the reason for this exclusion is the lack of a consistent index that covers the period under study.[7]

How different are these two regimes? Table 1 presents data for the whole sample and each subsample separately for the growth rate of the real wage and inflation. The differences across regimes are stark. Real wages (a proxy for consumption) grow faster and are more stable during market-friendly periods. At an annual level, they exhibit zero growth during populist periods and about 0.2 percent (per month) during periods in which the prevailing macro policy is market friendly. Relative to more developed economies, Argentina shows a very large variability of the growth rate of our proxy for consumption. The ratio of the mean growth rate to its standard deviation for the whole period is about 29, while in the U.S. the ratio is about 1.88, measured by the Real Personal Consumption Expenditure, from 1981 to 2019.

The differences in inflation across regimes are even larger. The monthly inflation rate is about 11 times higher, on average, in populist periods. The standard deviation is also higher. At these levels of inflation, it

6. This classification is arbitrary. We have experimented including the 2002–2011 period as part of the populist regime, and the results are virtually identical. Ocampos (2018) developed an index that includes the gap between official and black market exchange rates, fiscal deficit, and differences between import and export exchange rates, among other variables. His sample includes the years 1982–2013. According to his Index 1, the relevant value for the years that we consider market friendly is 3.90, while the corresponding value for the populist years is 6.42. In the appendix (Section 6.9) we report the results of the exercise where portfolios are chosen optimally for alternative definitions of the two regimes. The results are similar.

7. It is possible to use official statistics corresponding to the MERVAL index for the period 2004–20, but we could not find data covering the whole period. The stock market capitalization relative to GDP in Argentina is very small. According to the World Bank, it was less than 9 percent in 2019, while the average for Latin American countries exceeds 50 percent, and it reaches 190 percent in the U.S.: https://databank.worldbank.org/reports.aspx?source=2series=CM.MKT.LCAP.GD.ZScountry=

Table 2
Monthly Asset Returns (%)

Asset	Mean ($\bar{r}_i^S$)	St. deviation (σ_i^S)
CD	-0.77	4.65
UVA	0.42	8.27
RE	0.79	7.92
U$S	0.61	12.17
B	2.02	29.14

is reasonable to assume that minimally informed investors can distinguish between nominal and real returns. Thus, our choice of only focusing on real returns appears to be justified.

Overall, we find that these two indicators convey the basic message: economic outcomes under the two policy regimes are starkly different. Ignoring the possibility of regime switching is likely to result in mistakes in understanding the performance of individual portfolios.

3. RISK AND RETURN

In this section we present the basic features of the risk-return trade-off for a variety of assets.

3.1 Individual Assets

What is the return-risk trade-off for individual assets? Table 2 shows average monthly (real) returns, $\bar{r}_i^S$, (in percentage terms) as well as their standard deviations, σ_i^S, (also in percentages) corresponding to the full sample.[8] The differences are large. Investing in blue (B) dollars earns the highest return but also has the highest standard deviation. Investing in real estate (RE) earns the second-highest return. From the perspective of a mean-variance investor, these two assets dominate the returns of investing in UVAs and U$S dollars.

Even though we have ignored the possibility of default (at least conditional on the regime), it is important to emphasize that some "safe" investments from the perspective of an American investor (e.g., bank CDs) are risky in Argentina due to the large (and many times hard to predict) swings in the inflation rate. Thus, the riskiness of some assets is associated to the large change in their value in terms of goods associated with unanticipated changes in inflation.

These results hide large differences in the first and second moments of asset returns depending on the policy regimes. Table 3 presents the same statistics but distinguishes the policy regime.

The differences are shocking: First, investments in dollars (both official (U$S) and blue (B)) earn high returns during populist periods and negative returns during periods in which financial markets operate more freely. Second, the standard deviations of the returns are also much smaller during periods in which the policy is more market friendly, which reflects the overall stability of the economy during those periods. The third interesting feature is that the asset that displays the smallest difference between regimes is real estate: the expected returns are similar across periods, and the standard deviation during market periods is about one-third of the value in the populist periods. This is a much smaller relative decrease than the corresponding changes for other asset classes, and in part it reflects the preference of Argentinean middle-class investors for saving in the form of "bricks," as investments in real estate are popularly known. Tables 4 and 5 display the correlation matrices for the two regimes. In general, except for real estate and the two measures of the returns to foreign exchange, the correlations are rather small. A low return asset (UVA) is the only one that displays a negative correlation with real estate, official dollar, and dollar blue.

Another tool to describe the risk-return trade-off is the minimum variance frontier.[9] This frontier displays the highest possible return from combining all assets for a given measure of the portfolio's risk (its variance). To highlight how different regimes result in different risk-returns trade-offs, we compute the minimum variance frontier for the whole sample and for each subsample. When we allow investors to form unrestricted portfolios (which allow shorting), we find that for any given level of risk—as measured by the standard deviation—the expected return in a market regime is uniformly higher.

8. All the data were kindly provided by Federico Sturzenegger and Santiago Mosquera and were used in Mosquera and Sturzenegger (2020). The appendix contains a brief description of the data.

9. The original pioneering works are Markowitz (1952), Sharpe (1964), and Lintner (1965). For a good summary of the Capital Asset Pricing Model, see Perold (2004).

Table 3
Monthly Asset Returns (%)

	Populist sample		Market sample	
Asset	Mean	St. Dev.	Mean	St. Dev.
CD	-1.92	7.03	0.03	0.92
UVA	0.78	12.86	0.17	1.18
RE	0.86	11.78	0.74	3.21
U$S	2.08	18.65	-0.41	2.80
B	5.68	45.17	-0.52	3.46

Table 4
Correlation Coefficient (Market)

	CD	Dollar	Real estate	UVA	Blue
CD	1.000	0.237	0.296	0.259	0.070
Dollar	0.237	1.000	0.708	-0.102	0.781
Real estate	0.296	0.708	1.000	-0.087	0.507
UVA	0.259	-0.102	-0.087	1.000	-0.090
Blue	0.070	0.781	0.507	-0.090	1.000

Figure 1 shows the minimum variance frontier for the whole sample and for each of the two subsamples. It shows that not only are expected returns higher (for a given standard deviation) during market periods, but the lowest risk portfolio in a market regime is also several times safer than the minimum variance portfolio in the populist regime, consistent with the differences in the covariances between assets in the two regimes.

Figure 1
Minimum Variance Frontier (Unconstrained)

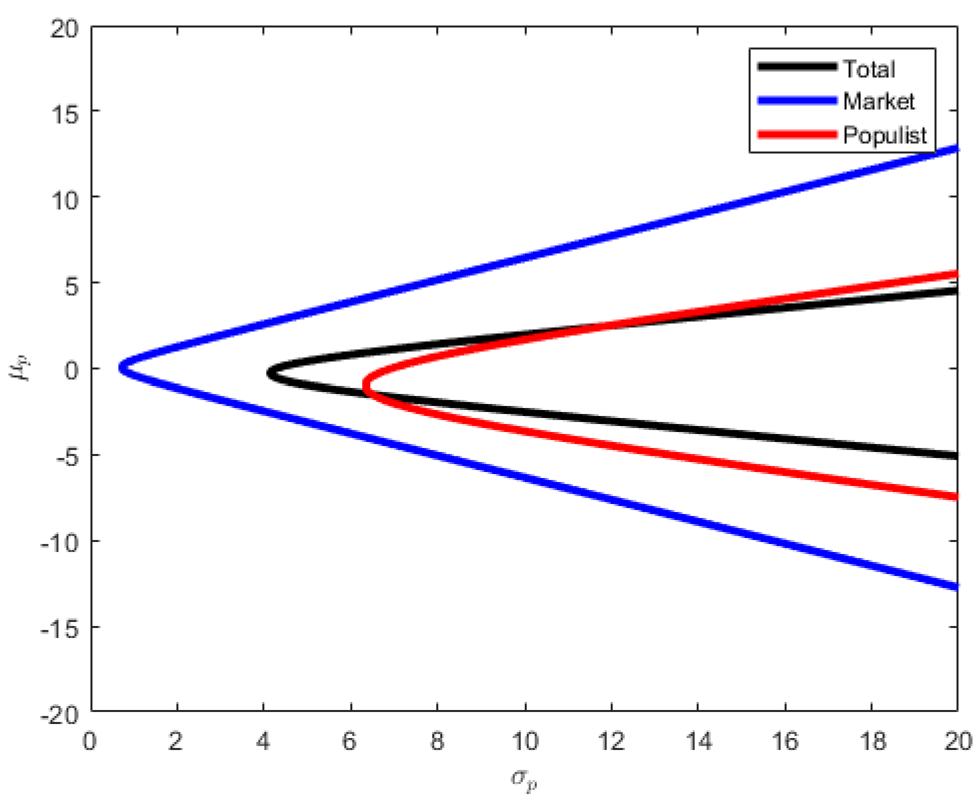
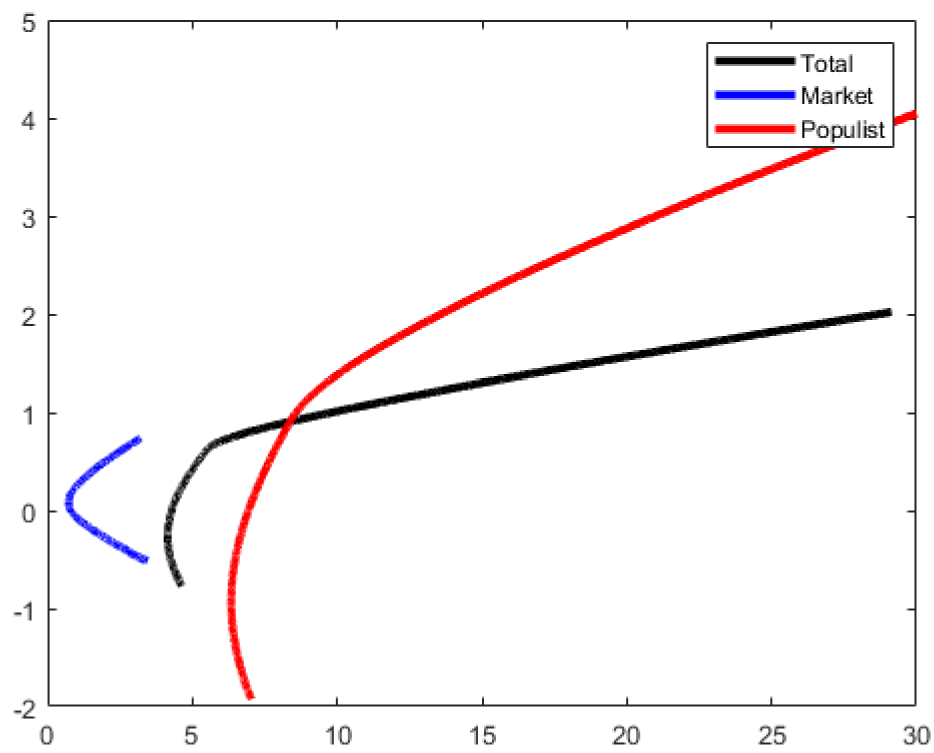


Table 5
Correlation Coefficient (Populist)

	CD	Dollar	Real estate	UVA	Blue
CD	1.000	0.111	-0.017	0.087	0.164
Dollar	0.111	1.000	0.813	-0.083	0.890
Real estate	-0.017	0.813	1.000	0.107	0.740
UVA	0.087	-0.083	0.107	1.000	-0.011
Blue	0.164	0.890	0.740	-0.011	1.000

The previous result allows investors to short every asset. If we restrict portfolios to contain only long positions, the differences across regimes are starker. Figure 2 displays the risk-return trade-offs in the no-shorting case. The differences across regimes are very large: the safest portfolio in the populist regime has a risk that is almost twice the standard deviation of the riskiest portfolio in the market regime. On the other hand, the highest expected returns during populist periods greatly exceed those of the market periods.

Figure 2
Minimum Variance Frontier (Constrained)



Overall, this first look at the risk-return trade-offs across regimes shows there are large differences in returns (and in the standard deviation) and that even the minimum variance portfolios vary across regimes. In Appendix Section 6.9 we report changes in the sample to allow financial crisis in the market periods, and we find no significant differences with the benchmark case.

4. PORTFOLIO RETURNS AND REGIME CHANGE

A natural next step is to go beyond the simple measures of risk and return and to determine what is the *optimal* portfolio for an investor who understands that returns vary across regimes and regimes are not permanent; that is, there is a nonzero probability of a regime change at any given time.[10]

The previous exercise shows that, depending on the desired rate of return, a portfolio's composition changes dramatically across policy regimes. In this section we make progress on understanding the optimal portfolio for risk-averse investors who account for regime changes and know it is not costless to change their portfolio's composition.[11]

In our setting a portfolio is a set of weights, $\alpha = (\alpha_{CD}, \alpha_{U\$S}, \alpha_{RE}, \alpha_{UVA}, \alpha_B)$, that add up to one. A restricted portfolio requires that, in addition, the α_k cannot be negative. We assume that the expected return of a portfolio in state $j \in \{M, P\}$ is given by

$$\mu_j(\alpha) = \sum_{k \in \Upsilon} \alpha_k r_{k,j}$$

and the variance of the portfolio is

$$\sigma_j^2(\alpha) = \sum_{k \in \Upsilon} \left(\alpha_k r_{k,j} - \mu_j(\alpha)\right)^2,$$

where the set Υ is $\{CD, U\$S, RE, UVA, B\}$.

Preferences are then given by

$$U_j(\alpha) = \mu_j(\alpha) - \frac{\theta}{2}\sigma_j^2(\alpha).$$

We assume that the investors care about expected returns and dislike uncertainty.

We consider the problem of an investor over a long horizon who understands there will be regime changes and that it is (potentially costly) to change a portfolio. Formally, the investor solves

$$\max_{\alpha \in \Upsilon} E \int_0^{\infty} e^{-\rho t} U_{j(t)}(\alpha_t) dt - \sum_{n=0}^{\infty} e^{-\rho n} c_{j(n)},$$

where the expectation is taken over the stochastic process of regime change and individual states that capture frictions in adjusting the optimal portfolios. Here $j(s)$ indicates the state (either M or P) at time s, while $c_{j(n)}$ is the fixed cost of changing a portfolio when the state is $j(n)$ time n. We use n to denote the jump times when the economy switches from one regime to the other.

Since regime changes are often periods in which many activities are disrupted, it is not obvious that investors can adjust their portfolio instantaneously. We capture this delay by creating a state after a regime switch in which portfolios are unchanged. We view the switch from state M to P as driven by a Poisson process with parameter π_M, implying that the expected duration of a market period is $1/\pi_M$. The switch from P to M is captured by a Poisson process with parameter π_P.

Suppose the economy is in state M and it switches to P. An individual i cannot immediately change his portfolio (at any cost) for a random period of time with expected duration $1/\eta_M^i$. There is a similar waiting period when the switch is from P to M. In this case the relevant expected time is $1/\eta_P^i$.

It is convenient to describe the value of a portfolio using a recursive formulation. Let $V_j(\alpha)$ be the value of holding portfolio α in state $j \in \{M, P\}$. Then, the appropriate valuation formula is

$$\rho V_M^i(\alpha) = U_M^i(\alpha) + \pi_M \left[V_{MP}^i(\alpha) - V_M^i(\alpha)\right],$$

10. Note that our specification of regimes does not coincide with political mandates. In other words, the same administration can choose populist and market-friendly policies.

11. There is extensive literature on portfolio adjustment costs. There are two types of costs, transaction costs and observation costs. The former generate state-dependent portfolio rebalancing, while the latter generate time-dependent portfolio rebalancing. Our model falls into the first category; some examples of these can be found in Bonaparte and Cooper (2010); Bonaparte, Cooper, and Zhu (2012); and Muhle-Karbe, Reppen, and Soner (2017). For our case, fixed adjustment costs generate an inaction region, so investors tend to make infrequent adjustments of their portfolios. In particular, Rieger (2015) documents that these costs tend to lower the volume of trading but increase the volatility of asset prices. On the other hand, for models with observational costs, the adjustment is time dependent. Examples of these can be found in Abel, Eberly, and Pangeas (2007); Alvarez, Guiso, and Lippi (2012); and Huang and Liu (2007).

where $V^i_{MP}(\alpha)$ is the value of the (fixed) portfolio α in state P *before* the investor has had a chance to make any adjustments. It follows that $V^i_{MP}(\alpha)$ is the solution to

$$\rho V^i_{MP}(\alpha) = U_P(\alpha) + \eta^i_P \left[\max\left(\max_{\alpha'} V^i_P(\alpha') - c^i_P, V^i_P(\alpha)\right) - V^i_{MP}(\alpha)\right].$$

Note that when the individual can change the portfolio, the optimal decision depends on both the cost of switching and the value of the "old" portfolio in the new regime.

The value of switching (net of costs) is simply $\max_{\alpha'} V^i_P(\alpha') - c^i_P$. If this exceeds the value of the old portfolio in state P, $V^i_P(\alpha)$, then it is optimal to pay the cost and switch. In this case the new payoff is $\max_{\alpha'} V^i_P(\alpha') - c^i_P$. If the cost of switching is high, then the investor does not adjust the portfolio and the value is $V^i_P(\alpha)$.

The Hamilton-Jacobi-Bellman equations that describe the value in state P are similar.

4.1 Small Switching Costs

If monetary switching costs are small, that is, if the c^i_j are small, then the investor will choose the best portfolio after a regime switch as soon as this is possible. In this section we let the monetary switching costs be small but keep the time switching costs unchanged. Formally, we assume that $\max_{\alpha'} V^i_P(\alpha') - c^i_P > V_P(\alpha)$. In this case, the optimal portfolio in state M is given by

$$\alpha^*_M = \text{argmax}_\alpha \ H_M(\alpha) \equiv U_M(\alpha) + \frac{\pi_M}{\rho + \eta_P} U_P(\alpha).$$

The optimal portfolio maximizes a weighted average of the payoffs in each of the two states. The magnitude of the factor $\pi_M / (\rho + \eta_P)$ determines how much weight an investor who is choosing his portfolio during a market period will assign to the performance of the portfolio in the populist regime. This factor increases as the likelihood of a switch to the populist regime becomes higher (the higher is π_M) and as the waiting period until the portfolio can be adjusted grows longer (the lower is η_P).

The optimal portfolio in the populist regime solves an analogous equation, and it is given by

$$\alpha^*_P = \text{argmax}_\alpha \ H_P(\alpha) \equiv U_P(\alpha) + \frac{\pi_P}{\rho + \eta_M} U_M(\alpha).$$

Let

$$V^+_j \equiv \max_{\alpha'} V_j(\alpha'), \text{ for } j \in \{M, P\}.$$

The appendix describes the expressions for V^+_j, which gives the value of an investor in state j of following the optimal strategy, taking into account switching regimes and costs.

Let $\hat{\alpha}_M$ be the optimal portfolio for an investor in state M if the economy were to stay in that state forever. Thus, the value that this investor would obtain is

$$\hat{V}_M = \frac{U_M(\hat{\alpha}_M)}{\rho} = \frac{\mu_M(\hat{\alpha}_M) - \frac{\theta}{2}\sigma^2_M(\hat{\alpha}_M)}{\rho}.$$

Then we can define an "equivalent expected return,"$\tilde{\mu}_M$, as the expected return that an investor who faces risk $\sigma^2_M(\hat{\alpha}_M)$ would demand to be indifferent between this portfolio and the value $\bar{V}_M$. Thus,

$$\frac{\tilde{\mu}_M - \frac{\theta}{2}\sigma^2_M(\hat{\alpha}_M)}{\rho} = V^+_M.$$

It follows that

$$\tilde{\mu}_M = \mu_M(\hat{\alpha}_M) - \rho\left(\hat{V}_M - V^+_M\right).$$

The term $\rho\left(\hat{V}_M - V^+_M\right)$ measures the loss of utility—in expected returns—associated with the instability of the Argentine economy relative to the ideal alternative in which the economy is always in the M regime.

4.2 Large Switching Costs

In this section we examine the optimal decision of individuals that face large switching costs. Effectively, this assumption implies that $\max_{\alpha'} V_j^i(\alpha') - c_j^i < V_j(\alpha)$ for $j \in \{M, P\}$. This, in turn, implies that in the market regime, the value of a portfolio α is given by

$$\rho V_M^i(\alpha) = U_M^i(\alpha) + \pi_M \left[V_{MP}^i(\alpha) - V_M^i(\alpha) \right],$$

and $V_{MP}^i(\alpha)$ is

$$\rho V_{MP}^i(\alpha) = U_P(\alpha) + \eta_P^i \left[V_P^i(\alpha) - V_{MP}^i(\alpha) \right].$$

Solving for $V_M^i(\alpha)$ (see the appendix), it follows that its value is proportional to

$$G_M(\alpha) = H_M(\alpha) + \frac{\pi_M}{\rho + \eta_P} (Z_M - 1)\, U_P(\alpha)$$

and $Z_M > 1$ if and only if

$$(\rho + \eta_P)(\rho + \eta_M) > \pi_P \pi_M,$$

which is satisfied when the expected time required to adjust the portfolio is relatively short (this corresponds to a high η_j) relative to the duration of a regime. These restrictions are clearly satisfied in the data. Consequently, the implications are as follows. Since the optimal portfolio with small costs maximizes $H_M(\alpha)$, the optimal portfolio for agents with large switching costs puts more weight on the return of the portfolio after a switch: during the market period, these investors choose a portfolio (relative to the small-cost investors) that puts more weight on the payoff in the populist period. A similar expression holds for the investor who enters the market in the populist regime.[12]

4.3 Taking Stock

For an investor who can be characterized as a "small switching cost" investor based on the amount of time he has to wait until he can adjust his portfolio (as captured by η_M and η_P) and the actual costs he faces when changing the composition of his portfolio (as captured by (c_P, c_M)), the model implies that he continuously readjusts his portfolio every time a regime changes. At the other end, a "large switching cost" investor chooses his optimal portfolio—which depends on the regime when he first entered the market—and never changes.

The truth for a given investor is probably a mixture of the two extremes: an individual sometimes faces small costs and sometimes large costs. In what follows we will explore—under a variety of possible parameterizations—the differences in the portfolios across types of investors (high and low switching costs) and regimes (market and populist).

4.4 Calibration

To quantify the impact of regime changes, we must estimate the parameters of the model. In this section we describe the strategy that we use to select reasonable parameter values. One key parameter is the degree of risk aversion θ. To estimate risk aversion, we consider the expected value of an investor in the U.S. who chooses between a risky portfolio and safe portfolio using the same risk-variance preferences. Standard calculations show that the share of the risky portfolio is given by

$$\alpha = \frac{E(r^s) - r^f}{\theta \sigma_s^2},$$

where $E(r^s)$ is the expected return to the risky asset and σ_s^2 its variance, and r^f is the risk-free rate. In the U.S. the equity premium is somewhere between 4 and 8 percent, and the standard deviation of a broad index of the stock market is about 16 percent. There is some controversy regarding the share of the U.S. portfolio that is composed of safe assets (which correspond to $1 - \alpha$ in this calculation). Gorton, Lewellen, and Metrick (2012) estimate the safe share to be somewhere between 31 and 33 percent. Martin (2018), using a more conservative definition, estimates it at 25 percent. We take 30 percent as a compromise, and hence the risky asset share is 70 percent. This implies that, depending on the assumption about the equity premium, $\theta \in \{2, 4\}$.

The value of $1/\pi_j$ measures the expected duration of regime j in months. In our sample we find that, on average, market regimes last 91 months and populist regimes last 62. Thus, we estimate π_M=0.011 and π_P=0.016.

12. The appendix contains the expressions for the value of the dynamic problem in all cases.

Table 6
Calibration

Parameter	Notation	Value
Discount rate	ρ	0.0025
Market regime intensity	π_M	0.011
Populist regime intensity	π_P	0.016
Market delay	η_M	1
Populist delay	η_P	1
Market adjustment cost	c_M	0.0001
Populist adjustment cost	c_P	0.0001

Table 7
Optimal Portfolios

	Low costs				High costs			
Asset	$\alpha^U_{M,L}$	$\alpha^C_{M,L}$	$\alpha^U_{P,L}$	$\alpha^C_{P,L}$	$\alpha^U_{M,H}$	$\alpha^C_{M,H}$	$\alpha^U_{P,H}$	$\alpha^C_{P,H}$
CD	1.2774	0.0001	-0.3551	0.0000	1.2770	0.0000	-0.4198	0.0000
Dollar	-6.1307	0.0000	0.1786	0.1184	-6.1303	0.0000	-0.0484	0.0000
Real estate	5.5760	0.9994	0.5623	0.3945	5.5760	1.0000	0.8291	0.5531
UVA	-0.3486	0.0004	0.6252	0.4714	-0.3484	0.0000	0.6246	0.4302
Blue	0.6259	0.0000	-0.0109	0.0156	0.6257	0.0000	0.0145	0.0167
Mean	6.26%	0.74%	1.97%	1.04%	6.26%	0.74%	1.99%	0.91%
Variance	10.30%	3.21%	10.66%	8.70%	10.30%	3.21%	11.03%	8.46%

There are no estimates that we are aware of for time (delay) costs and rate of return costs. If there is no change of regime, the value of a portfolio is

$$V = \frac{\mu - \frac{\theta}{2}\sigma^2}{\rho}.$$

If we measure cost in terms of expected return, we have that

$$V - c = \frac{\mu - \frac{\theta}{2}\sigma^2}{\rho} - \frac{\bar{c}}{\rho}.$$

Then if $\bar{c} = x$, then $c = x/\rho$. A small switching cost is 0.01 percent on a monthly basis (which is about 12 basis points on an annual level).

If the time delay is about one month, then $\eta = 1$; if it is two weeks, then $\eta = 2$; and if it is two months, then $\eta = 1/2$. We experiment with those values. Our benchmark scenario assumes the delay is one month for both regimes, but we do a sensitivity analysis for different values of θ and η. The full calibration of our benchmark scenario is described in Table 6.

4.5 Findings

In this section we describe the results of our benchmark scenario. Table 7 shows the optimal portfolios for the low- and high-cost case.[13]

Our previous analysis showed that the minimum variance frontiers vary significantly depending on whether we assume (as in standard portfolio composition analysis) that the investor can hold negative positions in some asset (borrow) or not. To highlight how this distinction is critical, we separately analyze the two cases.

Unrestricted Portfolios The optimal portfolios for this case (when switching costs are relatively low) are in the columns labeled $\alpha^U_{M,L}$ for the market regime and $\alpha^U_{P,L}$ for the populist regime (Table 7). The corresponding portfolios for the high-switching cost case are $\alpha^U_{M,H}$ and $\alpha^U_{P,H}$.

13. In Appendix Section 6.9, we report the results using an alternative definition of regimes that includes, in the market regime, some crises. We do not find significant differences in the results.

There are several remarkable results. First, the existence of the two regimes encourage investors to take a large amount of risk. For example, in the market regime, $\alpha^U_{M,L}$, it is optimal to borrow a large amount (six times the value of the capital) in foreign currency to finance investments in real estate and time deposits. When the regime changes (the optimal portfolio is in the column labeled $\alpha^U_{P,L}$), the positions are undone: the only significant short positions is in domestic currencies at a fixed rate, while the most significant long positions are in real estate and adjustable deposits.

To illustrate how it is optimal to leverage a position, consider the return of the portfolio in the market regime. The expected return is a staggering 6.26 percent per month, compared with Table 3, where the highest return in the market regime is 0.74 percent. The standard deviation of the portfolio is over 10 percent. Interestingly, the riskiness of the portfolio is similar in both regimes, although the expected return is much lower (1.97 percent) in the populist regime.

We next estimate the costs of switching. Using a conservative estimate, the cost of a regime change from market to populism (relative to the alternative of a permanent market regime) is equivalent to a decrease in expected returns (controlling for the variability) of about 3 percent. This is a significant difference.

One way to summarize these results is that the market encourages investors to take risky positions with high leverage borrowing in foreign currency during market periods and a more conservative stance in populist periods. Note that the riskiness of the portfolio is about the same in both regimes but (see Table 3) the volatility of returns of individual assets is much higher in the populist regime.

The results for the large cost of switching (which is close to myopic investors) are very similar. The reason is simple: Given the (relatively small) instantaneous probability of change, it is optimal to invest for the present, paying little attention to the costs of switching.

Restricted Portfolios The results when investors cannot borrow are also surprising: In the market regime, basically 100 percent of the investment is allocated to real estate. During the populist regime, a little over 50 percent is invested in real estate and the rest in adjustable rate deposits. The returns are much lower than in the unrestricted case and so is the riskiness of the portfolio.

Sensitivity Analysis Since there is some uncertainty about some of the parameters section, Appendix Section 6.8 shows the results of changing some of the parameters. We find that decreases in risk aversion increase, as expected, the riskiness of the portfolio. Changes in the expected time of adjusting the portfolio have a small impact on the results. We also experiment with changes in the expected duration of a policy regime. When we make—contrary to the evidence—the market regime more transitory, the difference in the portfolios across regimes is very small, and the expected returns and the riskiness of the portfolio are much lower. When the market regime is transient, the optimal portfolio is close to the optimal portfolio in the base case in the populist regime. When only the populist period is transient, we get the opposite result. In addition, when the expected duration of the regimes changes, the differences between high- and low-cost switching become larger.

5. CONCLUSION

It is not surprising that in a country like Argentina—characterized by large and dramatic changes in economic policy, including changes that at times have amounted to confiscation of assets—the risk-return menus available to investors change with the policy regime. Using data from Argentina to better understand the consequences of populist economic policies relative to market policies, we find that relatively safe portfolios that perform well during market periods display a large negative return and very high risk during populist periods. In general, a robust finding is that if investors are constrained in terms of leverage (no shorting), then it is inevitable that a switch to a populist regime results in higher risk.

We also find that an investor who understands that regimes change randomly and that it is costly to adjust his portfolio will pick a portfolio that both reflects the current regime and accounts for the returns of that portfolio when the regime changes. In addition, we find that when investors (individuals as well as firms) are free to have short positions, a clear pattern emerges: It is optimal during market periods to borrow heavily in foreign exchange to invest (mostly) in domestic real estate. When the policy regime changes (to populism), the short position in U$S dollar is turned into a long position, and investments in real estate and adjustable deposits in domestic currency make up most of the portfolio. Investors are thus willing to take on a significant amount of risk.

This instability is a reflection of the costs of regime switches (and the poor economic performance of populism), but it is totally justified from the perspective of an individual: A fixed portfolio that performs relatively well in one regime can perform poorly when it changes. Portfolio adjustment —with the consequent disruption and changes in relative prices—is a necessity in turbulent economies.

We also find that when investors are not allowed to borrow to finance their portfolios—a friction that captures rigidities in the financial sector—the optimal portfolios include almost exclusively real estate in the market regime and a mix of real estate and time deposits in the populist regime. Overall, our results show that regime switches between populist and market regimes result in portfolio compositions that are quite different from what is observed in a more stable environment such as the U.S.

6. APPENDIX

6.1 Data

The data were shared by Santiago Mosquera and Federico Sturzenegger from the University de San Andres in Argentina and were used in Mosquera and Sturzenegger (2020).

Time deposits (CD): These correspond to 30 certificates of deposits in the formal banking system in nominal terms. The real returns were deflated using a version of the CPI modified for the periods in which the economic authorities reported incorrect values.

Adjustable bank deposits (UVA): These are deposits in the formal banking system, and the nominal return is adjusted depending on a weighted average of the inflation over the previous two months.

Real estate: This is an index in real terms with an imputation for the market value of leases.

U$S dollar and U$S dollar blue: See the text for a description.

6.2 Chronology of Economic Policies

1975–1991

- Real per capita income decreases by 20 percent
- Annual inflation exceeds 300 percent
- External debt increases
- The real exchange rate is overvalued
- Capital flight occurs

1991–2001

- Free market reforms and increases in foreign investment
- Privatization of state-owned enterprises
- External shocks (Long-Term Capital Management collapse and Russian debt crises)

2001–2002

- Large restrictions on withdrawals of bank deposits

2002–2011

- Increases in regulation
- Renationalization of some formerly state-owned enterprises
- Little interference with asset markets

2011–2015

- Large sovereign debt crises
- Major devaluation
- Increases in regulation
- Exchange controls and, in the latter part of the period, capital controls
- Renationalization of many firms

2016–2019

- Pro-market reforms
- Large deficits that were lowered gradually
- Flexible exchange rates
- No capital controls

6.3 Minimum Variance Frontier

The first step is to build the Minimum Variance Frontier, or the efficient frontier, by choosing optimal asset allocations to minimize the variance of the portfolio given a specific return. Mathematically, this problem can be expressed for our case as

$$\begin{aligned}
\min_{\{\omega_i\}_{i\in\Theta}} \quad & \sigma_p^2 = \sum_{i\in\Theta} \omega_i^2\sigma_i^2 + \sum_{\{(i,j)\in\Theta\,:\,i\neq j\}} 2\omega_i\omega_j Cov(i,j) \\
s.t. \quad & \mu_p = \sum_{i\in\Theta} \omega_i\mu_i \\
& 1 = \sum_{i\in\Theta} \omega_i \\
& \underline{\omega} \leq \omega_i \leq \bar{\omega},
\end{aligned}$$

where $\Theta = \{CD, UVA, RE, U\$S, B\}$ and CD denote CDs described above, UVA denotes UVA, RE denotes real estate, $U\$S$ denotes dollars, and B denotes blue dollars. Finally, μ_i and σ_i^2 denote the mean and the variance of each asset, respectively; μ_p is the mean of the whole portfolio; and σ_p^2 denotes its variance. To find the Minimum Variance Frontier, we solve the portfolio problem for different values of μ_p, which we describe below.

6.4 Portfolios

6.4.1 Unrestricted

Unconstrained portfolios: total sample

μ_p	σ_p	ω_{CD}	$\omega_{U\$S}$	ω_{RE}	ω_{UVA}	ω_B
0.1%	4.4014%	0.3747	–0.0271	0.3693	0.2838	–0.0007
0.3%	4.739%	0.2374	–0.0412	0.4594	0.3414	0.003
0.5%	5.1831%	0.1001	–0.0553	0.5495	0.399	0.0067
0.7%	5.7089%	–0.0372	–0.0695	0.6396	0.4565	0.0105

Unconstrained portfolios: market sample

μ_p	σ_p	ω_{CD}	$\omega_{U\$S}$	ω_{RE}	ω_{UVA}	ω_B
0.1%	0.7175%	0.5798	0.1461	0.0325	0.3558	–0.1142
0.3%	0.8072%	0.6538	–0.0234	0.2043	0.3017	–0.1364
0.5%	0.9915%	0.7231	–0.188	0.3756	0.2516	–0.1622
0.7%	1.2286%	0.793	–0.35	0.5469	0.2004	–0.1903

Unconstrained portfolios: populist sample

μ_p	σ_p	ω_{CD}	$\omega_{U\$S}$	ω_{RE}	ω_{UVA}	ω_B
0.1%	7.0662%	0.2706	0.0566	0.3473	0.3344	–0.0089
0.3%	7.3371%	0.2052	0.0697	0.3694	0.3648	–0.0092
0.5%	7.6575%	0.1363	0.0835	0.3927	0.3969	–0.0094
0.7%	7.9915%	0.0708	0.0966	0.4148	0.4274	–0.0097

6.4.2 Constrained

Constrained portfolios: total sample						
μ_p	σ_p	ω_{CD}	$\omega_{U\$S}$	ω_{RE}	ω_{UVA}	ω_B
0.1%	4.4081%	0.372	0.0007	0.3395	0.2874	0.0003
0.3%	4.7473%	0.2299	0.0002	0.4236	0.3462	0.0001
0.5%	5.1948%	0.0881	0.0006	0.5056	0.4052	0.0005
0.7%	5.9384%	0	0.0001	0.5734	0.3818	0.0446

Constrained portfolios: market sample						
μ_p	σ_p	ω_{CD}	$\omega_{U\$S}$	ω_{RE}	ω_{UVA}	ω_B
0.1%	0.7415%	0.5783	0.0167	0.0431	0.3569	0.005
0.3%	1.1603%	0.2328	0.0001	0.2879	0.4791	0.0001
0.5%	1.9889%	0.0038	0.0002	0.584	0.4117	0.0002
0.7%	3.0138%	0.0011	0.0001	0.9349	0.0637	0.0001

Constrained portfolios: populist sample						
μ_p	σ_p	ω_{CD}	$\omega_{U\$S}$	ω_{RE}	ω_{UVA}	ω_B
0.1%	7.0628%	0.28	0.0377	0.3491	0.3331	0.0001
0.3%	7.3402%	0.213	0.0507	0.3719	0.3644	0
0.5%	7.6522%	0.1464	0.0633	0.3945	0.3956	0.0003
0.7%	7.9943%	0.0795	0.0762	0.4172	0.4268	0.0003

6.4.3 Returns of Fixed Portfolio across Regimes

	Returns of a fixed portfolio across regimes			
	Unrestricted		Constrained	
	Market	Populist	Market	Populist
Mean	0.1	–1.155	0.1	–0.7342
SD	0.7175	7.9707	0.7415	7.0104
Mean	0.5	–2.1846	0.5	0.8203
SD	0.9915	10.925	1.9889	8.3279
Mean	0.7	–2.7079	0.7	0.856
SD	1.2286	13.2963	3.0138	10.9845

	Returns of a fixed portfolio across regimes			
	Unrestricted		Constrained	
	Populist	Market	Populist	Market
Mean	0.1	0.3025	0.1	0.3069
SD	7.0662	1.347	7.0628	1.3355
Mean	0.5	0.3318	0.5	0.3364
SD	7.6575	1.5511	7.6522	1.5374
Mean	0.7	0.346	0.7	0.3511
SD	7.9915	1.6553	7.9943	1.6435

6.5 Small Switching Costs

The relevant value functions are

$$V_M^+ = \frac{(\rho + \pi_P)\, H_M(\alpha_M^*) + \frac{\pi_M \eta_P}{\rho+\eta_P} H_P(\alpha_P^*)}{\Delta} - \left(\frac{\pi_M \eta_P}{\rho + \eta_P}\right)\left(\frac{(\rho + \pi_P)\, c_P + \frac{\pi_P \eta_M}{\rho+\eta_M} c_M}{\Delta}\right)$$

and

$$V_P^+ = \frac{(\rho + \pi_M)\, H_P(\alpha_P^*) + \frac{\pi_P \eta_M}{\rho+\eta_M} H_M(\alpha_M^*)}{\Delta} - \left(\frac{\pi_P \eta_M}{\rho + \eta_M}\right)\left(\frac{(\rho + \pi_M)\, c_M + \frac{\pi_M \eta_P}{\rho+\eta_P} c_P}{\Delta}\right),$$

where

$$\Delta = (\rho + \pi_M)\,(\rho + \pi_P)\,(1 - \varkappa(\pi_M)\varkappa(\pi_P)\varkappa(\eta_M)\varkappa(\eta_P)) > 0,$$

and for any $x \geq 0$,

$$\varkappa(x) \equiv \frac{x}{\rho + x} \in [0, 1).$$

In these formulations, α_j^* is the maximizer of $H_J(\alpha)$.

6.6 Large Switching Costs

In this case the value functions are

$$\tilde{V}_M(\alpha) = \frac{(\rho + \pi_P)\, H_M(\alpha) + \frac{\pi_M \eta_P}{\rho+\eta_P} H_P(\alpha)}{\Delta}$$

and

$$\tilde{V}_P(\alpha) = \frac{(\rho + \pi_M)\, H_P(\alpha) + \frac{\pi_P \eta_M}{\rho+\eta_M} H_M(\alpha)}{\Delta}.$$

The highest possible value for an investor who enters the market in regime M is

$$\tilde{V}_M^+ = \max_\alpha \frac{(\rho + \pi_P)\, H_M(\alpha) + \frac{\pi_M \eta_P}{\rho+\eta_P} H_P(\alpha)}{\Delta}.$$

Let the maximizer be denoted as $\tilde{\alpha}_M$. The corresponding value for an investor who joins the market in the P regime is

$$\tilde{V}_P^+(\alpha) = \max_\alpha \frac{(\rho + \pi_M)\, H_P(\alpha) + \frac{\pi_P \eta_M}{\rho+\eta_M} H_M(\alpha)}{\Delta}.$$

As above, the maximizer is denoted as $\tilde{\alpha}_P$.

6.7 Large and Small Switching Costs: A Comparison

When will an investor choose to pay the switching costs? In the M regime, an investor will choose to pay the switching costs if $V_M^+ > \tilde{V}_M^+$. It follows that

$$V_M^+ - \tilde{V}_M^+ = \frac{(\rho + \pi_P)\left(H_M(\alpha_M^*) - H_M(\tilde{\alpha}_M)\right) + \frac{\pi_M \eta_P}{\rho+\eta_P}\left(H_P(\alpha_P^*) - H_P(\tilde{\alpha}_P)\right)}{\Delta} - \left(\frac{\pi_M \eta_P}{\rho + \eta_P}\right)\left(\frac{(\rho + \pi_P)\, c_P + \frac{\pi_P \eta_M}{\rho+\eta_M} c_M}{\Delta}\right).$$

It is clear that the first term is positive since the investor who pays the cost can tailor his portfolio to the regime, while an investor who does not pay the cost has to suffer a potentially lower value of his (fixed) portfolio when the regime switches. The second term is negative and converges to zero as the vector (c_P, c_M) becomes arbitrarily small.

To the extent that waiting times to change the portfolio (as captured by η_M and η_P) and actual return costs (as captured by (c_P, c_M)) vary across investors, the model is consistent with a fair amount of heterogeneity in optimal portfolios even though all investors share the same preferences for risk and return.

6.8 Sensitivity Analysis

Case $\theta = 2$

Optimal portfolios (%)

	Low costs				High costs			
Asset	α_M^U	α_M^C	α_P^U	α_P^C	α_M^U	α_M^C	α_P^U	α_P^C
CD	189.22	0.01	−134.42	0	189.23	0.00	−148.58	0.00
Dollar	−1232.38	0	37.33	14.59	−1232.41	0.00	−8.41	0.00
Real estate	1110.82	99.97	90.01	26.53	1110.86	100.00	145.06	53.74
UVA	−95.14	0.01	108.5	50.3	−95.15	0.00	108.31	39.84
Blue	127.48	0	−1.42	8.58	127.48	0.00	3.62	6.42

Case $\alpha_{U\$S} = 0$

Optimal portfolios (%)

	Low costs				High costs			
Asset	α_M^U	α_M^C	α_P^U	α_P^C	α_M^U	α_M^C	α_P^U	α_P^C
CD	−91.13	0	−31.49	0	−91.12	0.00	−43.12	0.00
Dollar	0	0	0	0	0.00	0.00	0.00	0.00
Real estate	255.56	99.99	66.98	48.18	255.57	100.00	80.04	55.31
UVA	53.59	0.01	61.35	47.54	53.59	0.00	62.79	43.02
Blue	−118.02	0	3.16	4.28	−118.03	0.00	0.29	1.67

Case $\eta_M = \eta_P = 1/2$

Optimal portfolios (%)

	Low costs				High costs			
Asset	α_M^U	α_M^C	α_P^U	α_P^C	α_M^U	α_M^C	α_P^U	α_P^C
CD	45.74	0	−35.62	0	45.76	0	−41.97	0
Dollar	−447.97	0	17.54	11.5	−448.04	0	−4.8	0
Real Estate	438.91	99.96	56.62	39.81	438.95	100	82.86	55.3
UVA	9.36	0.04	62.52	47.09	9.35	0	62.46	43.02
Blue	53.97	0	−1.05	1.6	53.98	0	1.45	1.68

Case $\eta_M = \eta_P = 2$

Optimal portfolios (%)

	Low costs				High costs			
Asset	α_M^U	α_M^C	α_P^U	α_P^C	α_M^U	α_M^C	α_P^U	α_P^C
CD	214.62	0.01	−35.46	0	214.62	0.00	−41.98	0.00
Dollar	−742.6	0	18.02	12.01	−742.60	0.00	−4.86	0.00
Real Estate	663.23	99.95	56.03	39.28	663.23	100.00	82.93	55.32
UVA	−86.76	0.03	62.52	47.17	−86.76	0.00	62.46	43.01
Blue	51.51	0	−1.11	1.54	51.51	0.00	1.45	1.67

Case $\eta_M = 2$ ***and*** $\eta_P = 1$

Optimal portfolios (%)

Asset	Low costs α_M^U	α_M^C	α_P^U	α_P^C	High costs α_M^U	α_M^C	α_P^U	α_P^C
CD	127.74	0.01	–35.46	0	127.70	0.00	–41.95	0.00
Dollar	–613.07	0	18.02	12.01	–613.03	0.00	–4.72	0.00
Real Estate	557.6	99.94	56.03	39.28	557.59	100.00	82.77	55.28
UVA	–34.86	0.04	62.52	47.17	–34.83	0.00	62.46	43.04
Blue	62.59	0	–1.11	1.54	62.57	0.00	1.44	1.68

Case $\eta_M = 1$ ***and*** $\eta_P = 2$

Optimal portfolios (%)

Asset	Low costs α_M^U	α_M^C	α_P^U	α_P^C	High costs α_M^U	α_M^C	α_P^U	α_P^C
CD	214.62	0.01	–35.51	0	214.62	0.00	–42.01	0.00
Dollar	–742.6	0	17.86	11.84	–742.60	0.00	–4.98	0.00
Real Estate	663.23	99.95	56.23	39.45	663.23	100.00	83.07	55.36
UVA	–86.76	0.03	62.52	47.14	–86.76	0.00	62.46	42.99
Blue	51.51	0	–1.09	1.56	51.50	0.00	1.47	1.65

Case $\pi_M = 100$

Optimal portfolios

Asset	Low costs α_M^U	α_M^C	α_P^U	α_P^C	High costs α_M^U	α_M^C	α_P^U	α_P^C
CD	–0.3547	0	–0.3551	0	–0.3558	0	–0.3551	0
Dollar	0.1798	0.1198	0.1786	0.1184	0.1766	0.1163	0.1786	0.1185
Real Estate	0.5608	0.3932	0.5623	0.3945	0.5647	0.3968	0.5622	0.3945
UVA	0.6252	0.4716	0.6252	0.4714	0.6252	0.4711	0.6252	0.4714
Blue	–0.011	0.0154	–0.0109	0.0156	–0.0107	0.0158	–0.0109	0.0155
Mean	0.44%	0.31%	1.97%	1.04%	0.45%	0.32%	1.97%	1.04%
S.D.	2.38%	1.72%	10.66%	8.7%	2.38%	1.72%	10.66%	8.7%

Case $\pi_P = 100$

Optimal portfolios

Asset	Low costs α_M^U	α_M^C	α_P^U	α_P^C	High costs α_M^U	α_M^C	α_P^U	α_P^C
CD	1.2774	0.0001	1.3923	0	1.2771	0	1.2784	0
Dollar	–6.1307	0	–6.3271	0	–6.1305	0	–6.1327	0
Real Estate	5.576	0.9994	5.7248	1	5.5761	1	5.5778	1
UVA	–0.3486	0.0004	–0.4143	0	–0.3484	0	–0.3492	0
Blue	0.6259	0	0.6243	0	0.6257	0	0.6257	0
Mean	6.26%	0.74%	–7.68%	0.86%	6.26%	0.74%	–7.13%	0.86%
S.D.	10.30%	3.21%	68.34%	11.79%	10.30%	3.21%	65.86%	11.79%

Case $\pi_M = \pi_P = 100$

Optimal portfolios

	Low costs				High costs			
Asset	α_M^U	α_M^C	α_P^U	α_P^C	α_M^U	α_M^C	α_P^U	α_P^C
CD	–0.3547	0	1.3923	0	0.5504	0	–0.4115	0
Dollar	0.1798	0.1198	–6.3271	0	–4.6931	0	–0.0141	0
Real Estate	0.5608	0.3932	5.7248	1	4.5392	1	0.7902	0.5424
UVA	0.6252	0.4716	–0.4143	0	0.0458	0	0.6249	0.4369
Blue	–0.011	0.0154	0.6243	0	0.5577	0	0.0106	0.0207
Mean	0.44%	0.31%	–7.68%	0.86%	4.99%	0.74%	1.99%	0.93%
S.D.	2.38%	1.72%	68.34%	11.79%	8.56%	3.21%	10.94%	8.5%

6.9 Different Sample

This section reports the results after changing the samples to avoid including/excluding key episodes in each sample, such as the 2001 crisis and the 2019 crisis. The new sample is constructed as follows:

- Populist periods
  - May 1981 to March 1991
  - January 2002 to November 2002
  - April 2011 to November 2015
- Market periods
  - April 1991 to December 2001
  - December 2002 to March 2011
  - December 2015 to December 2019

Table A reports the mean and standard deviation of each asset for both samples. After including the two crisis periods in the market sample, the results are not significantly different from the benchmark sample.

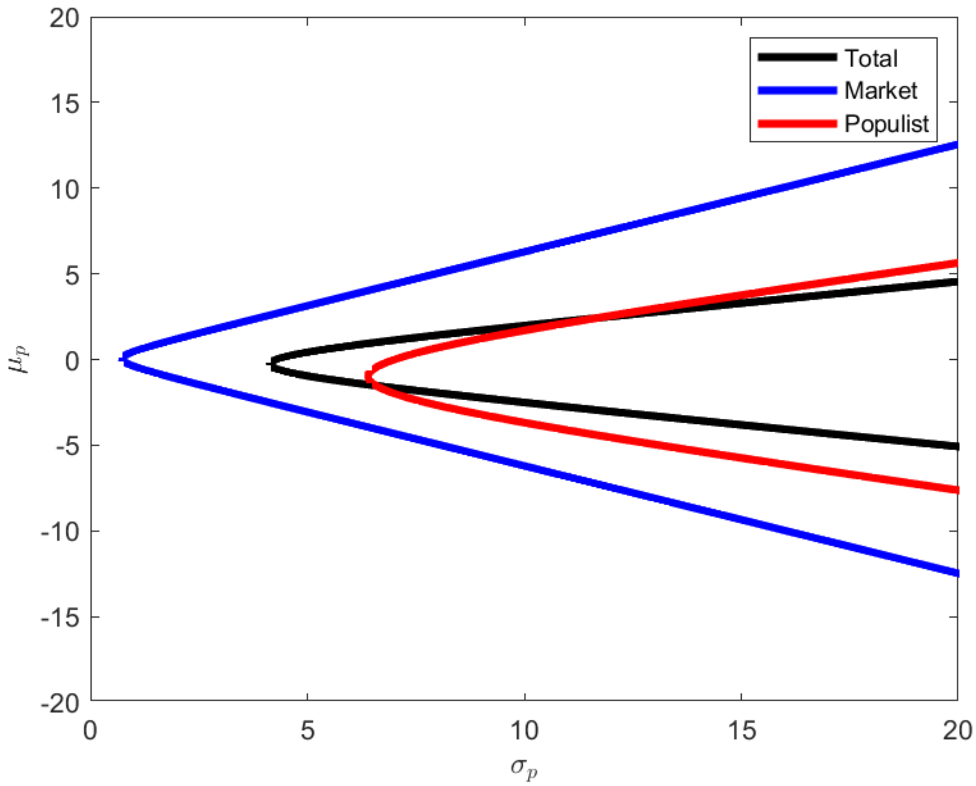
Table A: Monthly Asset Return (%)

	Populist sample		Market sample	
Asset	Mean	St. dev.	Mean	St. dev.
CD	–1.98	7.09	0.02	0.92
Dollar	2.16	18.84	–0.42	2.78
Real estate	0.91	11.90	0.70	3.19
UVA	0.81	12.99	0.16	1.18
Blue	5.74	45.63	–0.45	3.61

6.9.1 Unconstrained Case

As shown in the graph below, the results of changing the sample to include crisis episodes in a different regime are almost identical to the benchmark case shown in Section 3. During market periods, given a specific level of risk, the return in the market regime is always higher than in the populist regime. Moreover, as shown in Section 3, the minimum possible risk that can be achieved during the populist period is many times higher than the minimum possible risk in the market period.

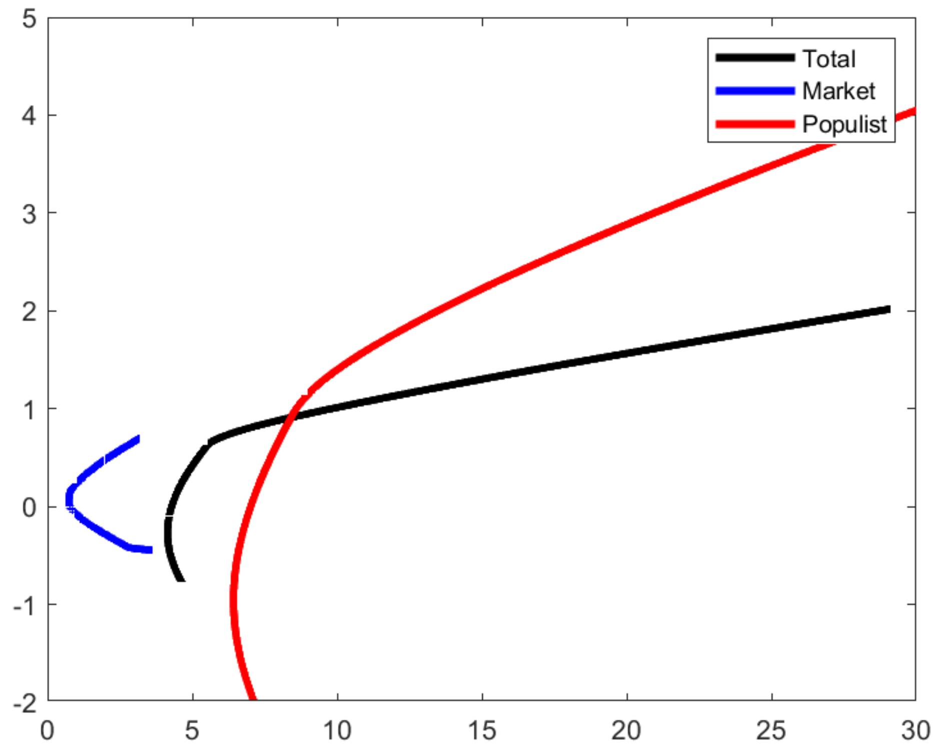
Figure 3
Minimum Variance Frontier (Unconstrained)



6.9.2 Constrained Case

The graph below shows the Minimum Variance Frontier for the case where agents cannot short any asset. In line with the previous results, the findings do not change significantly.

Figure 4
Minimum Variance Frontier (Constrained)



6.9.3 Optimal Portfolios

Here we present optimal portfolio allocations for the new sample. Compared with our benchmark case, the differences are small enough to confirm that our results are robust for the sample selection.

Table B: Optimal Portfolios (%)

Asset	Low costs				High costs			
	α_M^U	α_M^C	α_P^U	α_P^C	α_M^U	α_M^C	α_P^U	α_P^C
CD	130.71	0.00	-36.86	0.00	130.72	0.00	-42.31	0.00
Dollar	-627.09	0.00	18.80	12.51	-627.10	0.00	-3.53	0.00
Real estate	548.94	99.98	56.86	39.47	548.95	100.00	81.97	55.09
UVA	-30.46	0.01	62.77	46.83	-30.46	0.00	62.66	43.16
Blue	77.89	0.00	-1.57	1.19	77.89	0.00	1.21	1.75
Mean	6.10	0.70	2.07	1.08	6.10	0.70	2.08	0.95
Variance	10.13	3.20	10.85	8.78	10.13	3.20	11.17	8.58

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