Hungry for Change:

Food Imports, Urban Bias, and the Political Economy of Debt Default in Autocracies

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ABSTRACT

What drives autocrats to default on their sovereign debt? This paper develops the first theory of sovereign debt default in autocracies that explicitly investigates survival incentives of political actors in non-democracies. I argue that self-interested elites, fearful of threats to their tenure due to urban unrest, may be willing to endure the long-term borrowing costs that defaulting creates rather than risk the short-term survival costs of removing cheap food policies for urban consumers. I test my main claims that both urbanization and food imports should be associated with greater likelihood of autocratic default using panel data covering 43 countries over 50 years, finding that autocracies that are more reliant on imported food and that are more urbanized are significantly more likely to be in default on their external sovereign debt. I substantiate the mechanisms put forward in my formal theory through illustrative historical cases of sovereign debt default in Zambia and Peru, in which I demonstrate that fear of urban unrest in the face of rapidly increasing food prices does indeed drive autocratic elites to default on international debt obligations. In addition to providing the first political theory of debt default in autocracies, the paper introduces two robust predictors of autocratic default which have been overlooked in previous work, and in so doing highlights the importance of urban-rural dynamics in non-democratic regimes.

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1 Introduction

Recent fiscal crises in many countries have moved questions about the causes of sovereign debt default to the forefront of both theoretical and practical importance. However, while there exists a well-developed body of research on the economic causes and consequences of default, work considering default as a strategic choice by political actors is still largely in its infancy. Nowhere is this more obvious than in non-democracies facing fiscal crisis; while over half of all default cases in the past fifty years have occurred in autocracies, essentially all political theories of debt default focus solely on the democratic setting. This lack of emphasis on autocratic debt default is understandable if the causes of default are strictly economic. However, the survival incentives of political leaders vary substantially between democracies and autocracies, and a better understanding of the types of domestic pressures faced by governments can help clarify why some regimes are more likely to renege on their international financial obligations.

Early work on sovereign debt default by Eaton and Gersovitz (1981) and Bulow and Rogoff (1989) suggested that default by sovereign borrowers leads either to increased future borrowing costs or to losses in other "linked" areas such as trade, and work by Tomz (2007) has re-established the role of reputational costs in maintaining faithful debt servicing. Other emerging research suggests that institutional quality may also matter, but this has yet to be fully explored, especially the political mechanisms which undergird this relationship.[1] Recent summaries of the literature on sovereign debt default agree, concluding that "a systematic analysis of the relationship between sovereign debt, defaults, and political career concerns has not been undertaken and is an interesting area for future research."[2]

In the past few years, a small literature has begun to develop that looks explicitly at

[1] See Reinhart, Rogoff and Savastano (2003), Kraay and Nehru (2006), or Bandiera, Cuaresma and Vincelette (2010).

[2] Panizza, Sturzenegger and Zettelmeyer (2009, p692)

sovereign debt default as a political problem. Early work on this topic was spearheaded by Tomz (2002, 2004) on the political dynamics of default in Argentina's most recent crisis, as well as the account in Stasavage (2003) of the political pressures that helped make commitments to honor economic obligations by the English government credible following the Glorious Revolution. Much work since has focused on broad societal-level explanations for default outcomes; a set of empirical papers by Van Rijckeghem and Weder (2009), Saiegh (2009), and Kohlscheen (2010) have found that countries with parliamentary political systems tend to be less likely to default than presidential systems, as do countries ruled by coalition governments.[3]

However, each of these papers attempts to explain the political logic of default in *democracies only*; to the best of my knowledge, there is no pre-existing work that tries to tackle the question of why elites in *autocracies* might choose to renege on international debt obligations.[4] Yet, according to data from Reinhart and Rogoff (2009), over half of all default cases have occurred in non-democratic countries. In a sample of 70 countries representing over 90% of world GDP from 1960-2009, democracies have spent a total of 235 years in default, whereas autocracies have been in default for a total of 258 years; figure 1 shows that the same relationship holds when we look at the proportion of country-years spent in default. Autocratic default appears, if anything, more prevalent than democratic default, and yet our understanding of its underlying causes is limited at best.

[Figure 1 about here]

This paper develops a theory of sovereign debt default in non-democracies that takes as a starting point the self-interest of autocratic elites. In particular, I generate a novel theory of debt default in autocracies driven by urban restlessness in the face of rising food costs:

[3]For a recent summary of the literature on sovereign debt and default, see Tomz and Wright (2012).

[4]A partial exception to this claim is Van Rijckeghem and Weder (2009). There is also a related historical literature on institutional changes that led to improved borrowing rates for European states; see Cox (2011, 2012), North and Weingast (1989), Dincecco (2011), Stasavage (2010, 2011).

while in "normal times" autocrats often respond to urban pressure by providing food cheaply to urban consumers, during times of fiscal crisis such food provision programs may prove too costly to continue when external financing is removed. Thus, autocrats may be forced to choose between reducing food subsidies in order to remain faithful on debt repayment, or instead defaulting on obligations to international lenders so as to appease urban citizens threatening revolt in the face of costly food.

After formalizing these intuitions, the paper tests two main hypotheses: that greater reliance on food imports and higher rates of urbanization should each be linked with sovereign default in autocracies. Using panel data on 43 non-democracies from 1960-2009, I demonstrate strong and robust empirical evidence that autocracies facing urban pressure for cheap imported food are more likely to be in default on their sovereign debt; on average, an increase in food imports as a proportion of GDP from one standard deviation below the mean to one standard deviation above raises the likelihood of being in default by 21 percentage points, whereas a similar change in urbanization increases the likelihood of default by 67 percentage points.[5] In addition, in support of the theory of sovereign default in democracies articulated in Ballard-Rosa (2013), I find that the effect of urbanization on debt default in democratic countries is statistically significant and of *opposite sign* to that in autocracies; while food imports prove a robust predictor of autocratic default, they do not appear to play any significant role in explaining democratic default. I subsequently show that my initial analysis is not sensitive to alternative covariate profiles or estimation assumptions, and conduct a series of placebo tests on my results. In order to address concerns about the potential endogeneity of food import costs to unobserved regime attributes, I also use food commodity price shocks to instrument for the cost of food imports, finding substantively similar effects on the likelihood of autocratic default. Finally, I provide qualitative evidence for the proposed mechanisms through illustrative historical examples in Zambia and Peru.

[5]With all other covariates held at sample population means.

This paper makes three prominent contributions. To begin, it is the first work to develop explicitly a theory of politically-driven debt default in autocracies. Autocracies have defaulted on their international borrowing obligations at least as often as democracies have, and a theory that explains the political dynamics of default for this half of all observed cases promises greater leverage in understanding one of the most important fiscal dilemmas of our time.

Second, in evaluating the implications of this theory, the paper also provides the first evidence of the effects of urbanization and food imports on sovereign default. Prior empirical work has not examined these effects; indeed, no link between these factors and debt default has been theorized previously. For example, Bandiera, Cuaresma and Vincelette (2010) reports 52 separate controls from six prominent recent works on debt default, yet none of these includes urbanization or food imports. In addition, Van Rijckeghem and Weder (2009) uses a non-parametric nested classification methodology to identify factors which are likely to make countries vulnerable to debt crises, but urbanization and food imports are missing from their list of 40 different included covariates. This paper suggests robust empirical support for two key factors influencing autocratic default that have previously remained completely under the radar of extant analysis.

Finally, the strength of empirical support for the urbanization and food imports findings reconfirms the importance of urban-rural struggles in explaining autocratic political dynamics. Absent a political explanation linking urbanization to default in autocracies, the strong and robust positive correlation between urbanization and debt default found in this paper is difficult to account for, especially if one were to instead take urbanization as a mere corollary of economic development. If the finding in this paper that urban autocracies are more likely to default on their sovereign debt is merely a story about growth, then this would suggest that, all else equal, it is autocracies which are *more wealthy* that we should expect to default, an argument which contradicts standard theories linking debt, income, and default.

By developing a theory that investigates the role of urbanization as more than just a side-product of economic growth, this paper contributes to a line of work detailing urban biases in autocratic policymaking, and adds credence to claims that urban-rural conflict plays a significant role in shaping autocratic survival more broadly.

2 Urban bias, food imports, and autocratic debt default

My theory starts with an assumption that autocrats are fundamentally self-interested: non-democratic elites will attempt to maximize their chances of remaining in power by minimizing threats to their rule. In particular, I follow the literature on urban bias in arguing that, in many developing autocracies, the greatest potential threat to continued autocratic rule comes from the concentration of citizens in densely populated urban capitals.[6] This threat is due to the relative collective action benefits enjoyed by people in urban areas vis-*à*-vis their rural compatriots; if citizen unrest is the primary potential restraint on autocratic exploitation, and if mass mobilization is easier in cities than rural areas, we should expect to find that autocracies demonstrate an urban bias in their policymaking.[7] For example, if a rural farmer needs to walk several miles just to reach her nearest neighbor, whereas an urban citizen lives and works within a few feet of a host of potential fellow protesters, this suggests that the relative threat of civil opposition to a regime should be much greater in urban areas and so autocrats should favor urban consumers.[8]

This urban bias often results in significant food subsidies for the urban poor, usually at the expense of rural agricultural producers who are forced to sell their products at sub-

[6] See Lipton (1977), Schultz (1978), and especially Bates (1982)

[7] Wallace (2012)

[8] Wallace (2010) shows that agricultural policy in non-democratic countries does demonstrate a markedly pro-urban bias.

market prices due to government's monopsonist marketing power.[9] In those countries where domestic food production fails to meet urban demand, many autocrats also rely on foreign imports of food that are sold on domestic markets at heavily subsidized prices. However, this strategy can be very costly, and many autocracies generate substantial budget deficits in their quest to survive. While such a strategy may be feasible so long as external borrowing is available to cover the losses governments incur from such food policies, once governments face fiscal crisis, they may be forced to choose between re-establishing fiscal balance by removing or reducing food subsidies, or instead defaulting on their international obligations in order to continue to provide cheap food to a restive urban citizenry. Faced with loss of access to international lending, the ultimate trade-off for autocrats fearful of urban revolt may be between long-term economic consequences of default as opposed to short-term threat of removal from office when increased food prices trigger riots or more general regime opposition.

This trade-off is especially apparent when one considers that the IMF and World Bank were deeply opposed to government interference in food markets for the majority of time under consideration in this paper, and often included measures intended to curb such practices in conditional loans to developing countries.[10] Nearly all IMF austerity programs from the 1960s to the late 1990s required at least three key adjustments: eliminating government price interference; devaluing overvalued currencies; and reducing deficit spending. While these adjustments were all designed to restore macroeconomic stability, each also posed a serious threat to regimes reliant on the provision of cheap food to a poor populace to maintain social order. Most obviously, eliminating price interference mandates a direct end to food subsidies. However, even in cases where government could keep such subsidies, devaluing the national currency increases the relative costs of food imports, making subsidized food imports more difficult to afford. Finally, as food subsidies were a significant source of budget

[9] Bates (1982)
[10] Herbst (1990)

imbalance in many autocracies, deficit reduction created additional pressures on cheap food. Together, these conditions created significant risks for autocrats who viewed the prospect of austerity with great trepidation in anticipation of mass revolt. This made default, even with its associated economic costs, look much less unappealing to many regimes.

Several works emphasize that high food prices often lead to urban unrest.[11] The removal of food subsidies was a consistent trigger of urban revolt during the 1970s and 1980s, and recent studies show the same holds true today.[12] For example, Hendrix, Haggard and Magaloni (2009, p1) finds that in autocracies "international food prices are a significant determinant of the incidence of protest and riots, even when controlling for aggregate economic performance," an effect which is expected to be stronger in urban areas which are more reliant on marketed food. If the greatest threat to autocratic survival is the threat of urban unrest, and if such unrest is significantly more likely to occur when the price of food dramatically increases, I expect that autocrats facing fiscal crisis will be particularly unwilling to undo costly food policies, increasing the likelihood of sovereign default when threatened by rampaging urban citizens hungry for change.

Before moving to the model, I pause briefly to consider the default incentives of politicians in democracies. It may seem reasonable to assume that democratic rulers would wish to provide citizens with access to cheap food; indeed, a central premise in Sen (1999) is that democratic rulers should seek to avoid famines because of electoral losses that would ensue, whereas autocrats need not fear being removed from power when food shortages occur. Yet studies of urban-rural biases in democracies have often suggested that, contrary to the urban bias that often arises in autocracies, many democracies exhibit a *rural bias* in their policymaking, especially as applies to agricultural policy. For example, Varshney (1998) documents the rise of rural biases in Indian politics to the point of making farmer support

[11] As was emphasized in Bates (1982).

[12] Walton and Seddon (2008), Lee and Ndulo (2011)

a "third-rail" in India; Bates and Block (2011) finds that the negative relationship between rural population size and agricultural support in African non-democracies is reversed in regimes with competitive elections; while Davis (2003) highlights the disproportionate power accorded to rural political actors in developed democracies like the U.S., the E.U., and Japan. Yet why should there exist such a marked difference in urban and rural biases across political regimes?

At a basic level, the argument for urban bias in autocracies is premised on an assumption that the primary source of citizen influence in non-democracies is their capacity to credibly threaten mass mobilization. Yet the survival incentives of political leaders in democracies are likely quite different. Indeed, while a democratically-elected incumbent is unlikely to want counter-regime protests to take place, the institution of electoral turnover means that survival in office in democratic countries is premised upon electoral success – it is a rare case indeed when protesters in a democracy subsequently storm the presidential palace and actually evict the sitting leader. Thus, increased urban capacity to mobilize may carry less political weight in democracies than it does in autocracies. In fact, as detailed more completely in Ballard-Rosa (2013), if rural voters enjoy certain *electoral advantages*, then incumbents considering re-election may instead be biased towards rural interests rather than urban ones. Especially in cases where rural actors prove a critical component of electoral calculus, I do not expect to find that fear of the urban consumer should be a dominant driving force in democratic policymaking, contrary to my expectations for the average developing autocracy.[13]

[13]For additional studies on rural electoral biases in democracies, see Boone and Wahman (2013); Harding (2012); Stasavage (2005).

2.1 The Model

This section presents a one-period game in which an autocratic elite, faced with reduced access to foreign borrowing, seeks to maintain power and prevent urban riots through the provision of cheap food. When urban pressure is particularly high, autocrats may choose to suffer the long-term economic costs of debt default in exchange for securing short-term survival in office. While governments with monopsonist agricultural marketing power can force some of the costs of cheap food policy onto rural producers by artificially suppressing the market price of food, the fiscal costs of cheap food policy are likely to rise when more food comes from internationally-produced imports which the government buys at the world price and sells at a lower price to domestic urban consumers.

2.1.1 Social actors

I suppose a polity of three groups: an autocrat (A, of measure zero), urban citizens (U, who make up a proportion α of the total population, which has been normalized to unity), and rural citizens (R, who make up the remaining $(1-\alpha)$ of the population). Rural citizens engage in agricultural production of food b, with each rural actor producing $\bar{b}$ units of food, while urban citizens engage in a separate sector of production (such as manufacturing) of x with each urban actor producing $\bar{x}$ units of this good.

Without loss of generality, I normalize the price of x to one. In addition, I assume that the country is integrated into world markets, such that in equilibrium prices should be determined by world market-clearing prices. However, in the case of food, an Autocrat worried about the threat of revolt may have incentives for market interference, which can take two forms. First, the Autocrat enjoys monopsonist marketing power for domestically-produced food; all rural goods must be sold to the government initially, who then sells to urban consumers.[14] The Autocrat thus chooses a price p for food, which rural producers

[14]This was commonly the case in developing countries where government controlled access to line-of-rail,

must accept.[15] In addition, in cases where domestic food production is less than domestic demand, the Autocrat can import food, which it obtains at the prevailing world price of π but then sells at a subsidized price, with the per unit subsidy given by ϕ.[16] By the law of one price, in equilibrium it must be that $p = \pi - \phi$, which means that rural income is given by

$$y_R = (\pi - \phi)\bar{b} \tag{1}$$

Additionally, as the price of x has been normalized to one, urban income is simply

$$y_U = \bar{x} \tag{2}$$

Finally, citizen utility over food (b) and other goods (x) is described by the following utility function:

$$u_i(b, x) = x + ln(b) \tag{3}$$

After some algebraic rearrangement,[17] I describe equilibrium indirect utility for citizen $i \in \{U, R\}$ over the food subsidy ϕ, conditional on own income, as

$$v_i(\phi) = \begin{cases} y_i - 1 - ln(\pi - \phi) & \text{if } y_i \geq 1 \\ ln(\frac{y_i}{\pi - \phi}) & \text{if } y_i < 1 \end{cases} \tag{4}$$

In addition, I assume that there exists some *hunger threshold* given by $\tilde{b}$, such that, if $b < \tilde{b}$,

for example, which was generally the sole means of transporting marketable agricultural produce to urban centers.

[15] This interpretation of government monopsony is a stylization, meant to capture that government possesses some capacity for influencing domestic agricultural terms of trade that need not come at a direct fiscal cost. See Krueger, Schiff and Valdes (1988), Krueger et al. (1991) or Krueger (1996) for summaries of ways in which governments in developing countries have affected the urban-rural terms of trade.

[16] Where $\phi \in [0, \pi)$. In what follows, in order to simplify exposition I consider only those cases with non-negative food imports, although the main comparative statics of interest do not change in a broader model that allows countries to be net food exporters.

[17] See Appendix A.

citizens will always choose to engage in regime opposition. This captures the fact that, below some low level of consumption, citizens facing starvation will consider the status quo as highly undesirable; this should act as a trigger point for political activity by social groups, as described below. For ease of analysis, I assume that $\bar{b} \geq \tilde{b}$ always.[18]

Facing a food subsidy ϕ, urban citizens choose between passively accepting the government's policy or mobilizing in opposition to the regime at some cost, which is successful in bringing down the autocracy and ushering in a transition to democracy with probability v, where this likelihood of success is increasing in the proportion of the population that takes place in rebellion. Urban citizens' choice to "acquiesce" or "oppose" is thus given by $\omega(\phi) \in \{0, 1\}$, with $\omega(\phi) = 1$ indicating revolt. Given the choice between passive acceptance and costly mobilization, the hunger threshold marks a sharp dividing line such that any actor facing starvation will engage in regime-threatening protests almost certainly. This is nothing more than a formalization of often observed "bread riots," a form of mass protest which has occurred throughout recorded political history. As noted by Walton and Seddon (2008, p25), from the mid-sixteenth to the mid-nineteenth century, "riot was the most common form of popular protest and uprisings related to food were the most common form of riot." In addition, following increased volatility in world commodity markets, this form of mass mobilization has returned with particular force starting again in the 1970s leading up to the present day.

I have so far assumed intuitively that citizen collective action is such that revolt is preferable to starvation. However, in order to make predictions of the model as straightforward as possible, I make an additional assumption about the collective action environment: I assume that the costs of mobilization are high enough that citizens will *never* revolt if not facing starvation. While unlikely to hold true in all cases, this assumption helps fix intuitions by

[18]This is equivalent to assuming that the costs of rural collective action are such that the threshold for revolt is never met. Stasavage (2005) develops a similar model in which an autocratic ruler faces the threat of removal by urban citizens only.

focusing attention on a simple target: providing enough food to keep urban citizens from going hungry.

2.2 Autocrat

I assume that the Autocrat's utility, so long as it remains in power, is as follows:

$$u_A(\delta) = \chi + (1 - \delta)\rho l \tag{5}$$

where χ captures the (economic or psychic) benefits from being in power, $\delta \in \{0, 1\}$ is a binary default decision, l is a set of future international loans the Autocrat expects to enjoy if $\delta = 0$, and ρ captures the autocrat's present-discounting of expected future benefits.[19] For any non-zero set of future loans l, the autocrat should generally prefer not to default, as so doing guarantees this flow of subsequent resources. If the Autocrat is successfully removed from power, however, it accrues an outside payoff of zero.

In addition to choosing whether to default, the government also sets a per-unit food subsidy ϕ, where the total cost of this subsidy program must be feasible given the government's existing budgetary resources, γ, less any debt repayments it must make, d. Letting $C(\phi)$ represent the costliness of a given food subsidy level, the government's *budget constraint* is given by the following restriction:

$$\gamma - (1 - \delta)d \geq C(\phi) \tag{6}$$

As will be discussed in more detail below, the autocrat's decision of whether to default or not depends critically on whether the government can still afford a particular subsidy program

[19] Where I assume $\rho \in (0, 1)$. The comparative statics that follow are akin to those from an infinitely-repeated game with Markovian equilibria in which the autocrat's future borrowing costs depend on its default decision today.

while remaining constant on its debt payments.

2.3 Food subsidy cost

Given total domestic food production by rural actors of $(1-\alpha)\bar{b}$, I define total food imports $\beta(\phi)$ as (urban food demand + rural food demand - domestic food production), or

$$\beta(\phi) = \alpha b_U^* + (1-\alpha)b_R^* - (1-\alpha)\bar{b} \tag{7}$$

Considering the derivation of citizen ideal food consumption (b_i^* is detailed in the Appendix), it is clear that $\partial b_U^*/\partial\phi > 0$; that is, the quantity of food demanded by urban consumers is always increasing in the size of the subsidy. Additionally, in all cases where rural producers engage in marketing of their goods (when $y_R \geq 1$), it is true that $\partial b_R^*/\partial\phi > 0$. Intuitively, as the price of food falls, consumers will want to purchase more of it, and given this result, as food subsidies increase, the demand for imported food will grow as well.[20]

2.4 Timing of the game

Having now defined player strategies and preferences, I make explicit the timing of the game:

1. Nature draws a world price of food $\pi \sim F(\pi)$.
2. The autocrat chooses whether to default or not ($\delta \in \{0,1\}$) and selects a food subsidy ($\phi \in [0,\pi)$).
3. Urban citizens observe ϕ and decide whether to oppose the regime or not ($\omega(\phi) \in \{0,1\}$).

[20] Formally, $\partial\beta(.)/\partial\phi > 0 \,\forall\, \phi > 0$.

4. If urban citizens oppose the regime, the autocrat is successfully overthrown with probability v, and in expectation the democratic subsidy (ϕ^*_{democ}) is selected,[21] with payoffs accruing to each group. With probability $(1 - v)$, the revolt fails, and payoffs accrue according to the default and subsidy decisions of the autocrat.

5. If urban citizens do not oppose the regime, then payoffs accrue according to the default and subsidy decisions of the autocrat.

2.5 Equilibrium behavior

I now consider equilibrium behavior, which I solve via backwards induction. In the final stage of the game, if the autocrat has set a subsidy such that $b^*_U(\phi) \geq \tilde{b}$, urban citizens do not revolt, whereas if $b^*_U(\phi) < \tilde{b}$, then regime opposition takes place and is successful in removing the autocrat from power with probability v. When the autocrat selects a subsidy, it will take this revolt decision into account, and should generally prefer to set ϕ^* such that $b^*_U(\phi^*) = \tilde{b}$. However, whether this is feasible depends on the assets available to government in austerity or default. In cases where default would be necessary to afford urban demands, the autocrat's decision will depend as well on how much it values staying in power, its expected future benefits for continued repayment, and the threat posed to its rule by urban unrest.

2.5.1 Decision to default

Recall Equation 6 from above, which describes the Autocrat's budget constraint. Consider first those cases where the Autocrat can afford to appease urban citizens while still repaying its debt (when $C(\tilde{\phi}) \leq \gamma - d$). In such cases, the autocrat prefers debt repayment to default so long as $\rho l > 0$; that is, as long as it values any future access to credit, the unique equilibrium

[21] I derive this expected democratic subsidy in an online appendix.

is for the autocrat to choose to not default while providing sufficient food subsidies to urban consumers to earn their quiescence.[22] Thus, default should never occur in equilibrium when the government can afford to appease citizens while still making debt payments.

In cases where food subsidies have become expensive enough that they can only be afforded if the autocrat defaults (when $\gamma - d < C(\tilde{\phi}) \leq \gamma$), the Autocrat's strategy is reduced to a choice between defaulting and keeping high food subsidies, or instead imposing austerity and facing the threat of removal from office for any affordable subsidy. The Autocrat will choose default over austerity whenever $u_A(\delta = 0) \geq u_A(\delta = 1)$, or

$$\chi \geq (1 - v)(\chi + \rho l) \tag{8}$$

which can be rearranged to give the following *incentive compatibility constraint* for the autocrat:

$$\chi \geq \frac{\rho l(1 - v)}{v} \tag{9}$$

There are thus two conditions which must hold in order for the Autocrat to favor defaulting on its sovereign debt: first, the budget constraint under a given quiescence subsidy (given by Equation 6) must be infeasible under austerity, and the preferences of the government must be consistent with the incentive compatibility constraint (given in Equation 9).[23]

[22] Formally, when $C(\tilde{\phi}) < \gamma - d$, $\delta^* = 0$, $\phi^* = \tilde{\phi}$, and $\omega^*(\phi) = 0$.

[23] In cases where $C(\phi^*)$ is so high as to exceed available government resources even if international debts go unpaid (when $\gamma < C(\tilde{\phi})$), there exists no feasible subsidy which will prevent urban unrest. In such a case, any strategy by the Autocrat can be observed in equilibrium, and this may act as an "upper bound" to the effect of urbanization and food imports on autocratic default I identify below. Evaluating which countries are likely to fall into this parameter space is no easy task; that said, for countries with both very high levels of food imports and very high levels of urbanization, the costliness of cheap food provision is likely to be highest, suggesting the inclusion of an interaction term in empirical specifications.

2.5.2 Comparative statics

When considering the budget constraint, it is clear that governments with greater resources (higher γ) and less debt (lower d) should be more able to afford subsidies while still remaining constant on debt repayments, which reproduces two standard predictions from economic models of default. In addition, increases in the costs of a given subsidy program make it less likely to be feasible without default. As the exact cost of the quiescence subsidy varies depending on the income of both urban and rural citizens, I relegate explicit calculation of these costs to the Appendix while presenting a general discussion of the results in what follows. To begin, considering discussion of $C(\tilde{\phi})$ above, I expect default to be more likely when the world price of food is higher.[24] That spikes in the world price of food should make food imports more costly, and thus make food subsidy programs more difficult to finance, seems both intuitive and straightforward. In addition, it suggests an instrumental variables strategy: below, I use exogenously determined world food commodity prices to instrument for the cost of food imports in predicting the likelihood of sovereign debt default in autocracies.

As the cost of food subsidies increases with food imports, those autocracies more reliant on imported food should be more likely, all else equal, to consider defaulting in order to maintain subsidies ($\partial C(.)/\partial\beta > 0$ for any non-zero subsidy). In addition, in all but the most rural-biased autocracies,[25] larger urban populations drive up the costs of food subsidies. As such, the model predicts that both increased food imports as well as larger urban populations should be associated with greater likelihood of default in autocracies.

Turning now to the Autocrat's incentive compatibility constraint in Equation 9, I find that the probability of autocratic default should increase in the threat that urban unrest poses (higher v). While there are a host of factors that may affect the likelihood of successful

[24] It is shown in the Appendix that $\partial C(.)/\partial\pi > 0$ always.

[25] As shown in the Appendix, $\partial C(.)/\partial\alpha > 0$ is violated only for a limited subset of the parameter space where the food needs of exceptionally impoverished urban dwellers are outpaced by large food demand from wealthy rural producers.

revolt, the threat of rebellion should be greater as the proportion of the population taking part increases. This reinforces the comparative static on urbanization discussed above: as countries with larger urban populations face larger and more threatening riots during urban unrest, I again expect that more urbanized autocracies will favor default. This suggests that, even controlling for the indirect effect of urbanization on increased food costs, urbanization should still be related to autocratic default through a "collective action" channel. This gives me my two main comparative statics of interest to be tested below: controlling for other relevant factors, more urbanized autocracies and those with higher food import costs should be more likely to default on their sovereign debt.

3 Empirics

Having established several testable hypotheses of my theory of sovereign debt default in autocracies, I move on to evaluate these claims empirically. Before testing these hypotheses more rigorously, however, I call the reader's attention to Figure 2, which shows that, at a coarse-grained level, it does appear that autocrats more reliant on imported food are more likely to default on their debt.

[Figure 2 about here]

As can be seen in Figure 2, after dividing the sample into "low" and "high" food importers (those below or above the autocratic sample median of approximately 2.8% of GDP), I find that autocracies with above-average food import costs have spent nearly 38% more years in default than those with below-average food imports.[26] Additionally, as shown in Figure 3, more urbanized autocracies (those above the autocratic sample median of 41.8%

[26]High food importers spent 24.2% of total years in default, compared to 17.7% for low food importers.

urbanization) have spent nearly 55% more years in default compared to those with below-average levels of urbanization.[27]

[Figure 3 about here]

Of course, as in any bi-variate comparison, there may be a host of other factors driving these relationships; in what follows, I show that this pattern holds up under more complicated statistical investigation.

3.1 Data and estimation

My outcome of interest comes from the historical dataset on economic crises presented in Reinhart and Rogoff (2009); in particular, for my main dependent variable I use the measure of years a country spends in default to its external creditors. As explained in their work, a "sovereign default is defined as the failure of a government to meet a principal or interest payment on the due date (or within the specified grace period). These episodes include instances in which rescheduled debt is ultimately extinguished in terms less favorable than the original obligation" (11). Due to lack of earlier availability of other important covariates, I make use of default data beginning in 1960 and continuing up until 2009. Of the 70 countries covered by Reinhart and Rogoff's data, given my theoretical interest in explaining non-democratic default, I restrict the sample to only those country-years which are classified as autocratic, reducing the sample to 43 countries.[28]

The literature on sovereign default has converged on a limited set of important macroeconomic factors considered significant predictors of debt default.[29] Most obviously, a country's level of existing debt has been repeatedly associated with default crises, as countries without large debt burdens are unlikely to face serious trouble in servicing debt or correcting

[27] Autocracies with above average levels of urbanization have been in default 25.5% of the time, whereas less urbanized autocracies have spent 16.5% of all years in default.

[28] Measures of democracy are taken from the *DD* dataset in Cheibub, Gandhi and Vreeland (2010).

[29] See Bandiera, Cuaresma and Vincelette (2010, p2)

fiscal imbalances. I therefore include in all specifications a measure of *debt-to-GDP*, drawn from Reinhart and Rogoff (2010). In addition, it is standard to include a measure of *GDP per capita*, which I draw from the World Bank's World Development Indicators (WDI) and which, following normal practice, enters logged into each specification. Work by Kraay and Nehru (2006) on predicting default instances in the developing world highlights the importance of "shocks" in triggering debt crises; in their paper, they take *change in GDP* as capturing economic shocks generally, and I follow this approach as well. The dangers posed to a country's financial security by macroeconomic instability, as proxied by inflation rates, is emphasized in the recent summary of the literature by Bandiera, Cuaresma and Vincelette (2010), and so to address this concern I include a measure capturing whether a country is facing an *inflation* crisis.[30] Finally, much work on debt default controls for the effect of economic openess on a country's debt levels, and so I include as well a standard measure of *trade* as the sum of a country's exports and imports over GDP.[31] These five macroeconomic factors (debt/GDP, per capita GDP, change in GDP, inflation, and trade) have been consistently associated with external sovereign debt default in the literature on the subject, and so I use these five factors as a baseline economic model in predicting years in default.[32]

In addition, in order to test my hypotheses regarding pressures that hungry urban consumers put on autocrats fearful of revolt, I include both a measure of *urbanization*, which measures the percentage of the total population in a country which lives in an urban area,[33] as well as a measure of the value of food imports into a given country, scaled by GDP. In order to construct this measure of food imports, I make use of data reporting "food imports

[30]Taken from Reinhart and Rogoff (2009).

[31]Data for GDP per capita, change in GDP, and trade are all drawn from the WDI.

[32]I found that there existed non-trivial amounts of missing data scattered throughout several of these macroeconomic factors, and therefore chose to employ multiple imputation techniques to help deal with concerns that might arise due to the inefficiency or bias that can result from standard listwise-deletion approaches (King et al. 2001). A full discussion of the imputation procedures taken, as well as sensitivity of my results to these choices, is presented in an online appendix.

[33]Taken from the WDI.

as a proportion of merchandise imports," which come from the United Nations Statistics Division's Comtrade database. These are then combined with data on "Total Merchandise Imports" for each country, taken from the WTO, to generate a (current US) dollar amount of food imports into each country in a given year. However, as food imports should be scaled by country size, I take this measure of total food imports and divide it by the GDP of each country, producing a measure of *food imports over GDP*. Given comparative statics from the theoretical model developed above, I expect both urbanization rates and food imports to be positively correlated with external debt default in autocracies.

My baseline empirical model is of the following form:

$$default_{it} = \beta_1 food_{it-1} + \beta_2 urban_{it-1} + \gamma \mathbf{X_{it-1}} + \eta_i + \theta_t + \epsilon_{it} \tag{10}$$

where β_1 and β_2 are my two main effects of interest to be estimated, $\mathbf{X_{it-1}}$ is a vector of the five macroeconomic controls introduced above (*debt/GDP, GDP per capita, change in GDP, inflation* and *trade*), γ is a vector of coefficients to be estimated on each of these macroeconomic factors, η_i and θ_t are country and year fixed effects, and ϵ_{it} is the error term, with standard errors clustered at the country level to account for within-country correlations including serial autocorrelation in the data. Given my hypotheses, I expect both more food imports and higher levels of urbanization to make autocracies more likely to default (I expect $\beta_1 > 0$ and $\beta_2 > 0$). I first present results estimating this equation as a probit model,[34] and subsequently show that the results are not substantively changed when instead it is estimated using OLS, fixed-effects or conditional logit, or random-effects probit.

[34]Under the assumption of normality of the error term.

3.2 Results

Before moving to results from my full model, I briefly demonstrate support for my hypotheses linking food imports and urbanization with autocratic default at the bivariate level: Column 1 of Table 1 reports results from a bivariate regression of default years on food imports, while Column 2 reports the regression of default on urbanization rates. As can be seen, without the inclusion of any controls, both food imports and urbanization rates are positively and statistically significantly related to years of sovereign debt default in autocracies.

[Table 1 about here]

Of course, these results do not account for the major economic factors which have been previously identified as important predictors of debt default; Column 3 reports results from full estimation of Equation (10). Several of these macroeconomic factors are statistically significant predictors of years in default, and all are in the expected direction: autocracies with greater debt, smaller economies, facing economic downturns, and that trade less are more likely to be in default on their sovereign debt. However, even accounting for standard macroeconomic explanations of default offered by the literature, urbanization and food imports are both positively and significantly related to years of sovereign debt default in autocracies.

It is worth discussing in greater detail the finding that urbanization is strongly correlated with default in non-democracies. To begin, this finding is important as, to the best of my knowledge, it is the first time that the effect of urbanization on the likelihood of default has been tested. This suggests that, while the addition of urbanization and food imports does not invalidate earlier findings from the literature, it does point to potential gains in explanatory power from considering explicitly the influence of self-interested political actors on sovereign debt default. In addition, insofar as urbanization is often considered a proxy for development, one might argue that the effect I have identified is unrelated to the political

logic I develop.[35] Yet, upon reflection, this intuition does not seem to comport well with the actual findings. If my measure of urbanization is merely capturing economic development (ignoring for the moment that I am already controlling for both level of GDP per capita as well as change in GDP), then this would suggest that autocracies which are *more* developed are more likely to default on their debt, contradicting all standard economic accounts.

3.2.1 Robustness checks

Of course, one might worry that the effects of urbanization and food imports on the likelihood of default in autocracies may be spurious for a host of reasons, such as bias due to the omission of important covariates. For example, countries with larger populations are also more likely to have higher rates of urbanization, as well as potentially higher demand for imported food. If the size of a country is correlated with, say, greater likelihood of social divides that impede government's ability to resolve economic crises, then any relationship between urbanization, food imports, and default may simply suffer from omitted variable bias. Alternately, it may be that the effect of urbanization I have identified captures that, for the period under consideration, many developing countries relied on agricultural exports to generate foreign currency. If true, a positive correlation between urbanization and default may have nothing to do with urban pressure, but may be instead a function of less agriculturally-based developing economies facing more difficulties in adjusting to international shocks. To help control for these concerns, I introduce measures of (logged) *population*[36] as well as the *agricultural share of the economy* in a given country.[37]

Other work on economic crises has suggested that such events tend to be clustered as "twin" or even "triplet" crises, such as when a crashing currency drives up dramatically the costs of servicing foreign-denominated debt, or when the failure of a domestic banking

[35]For example, in a related study of determinants of historical borrowing rates in Europe, Stasavage (2011) uses data on urbanization as a proxy for economic growth.

[36]Taken from the Penn World Tables.

[37]From the WDI.

sector leads government to assume massive private debts, thereby endangering the health of sovereign bonds.[38] While I have controlled for crisis in a somewhat blunt form above by including information on changes in GDP, one may worry that this measure does not adequately capture the full spectrum of potential economic crises a country may face. If greater food imports result during domestic crises which also make sovereign default more likely, any relationship between food imports and default may be driven by some underlying omitted economic issue. To address this concern, I have constructed an additional measure of whether a country is facing any parallel form of economic crisis in a given year; this measure takes a value of one if Reinhart and Rogoff (2009) code the country as also suffering from any of the following forms of economic crisis: banking, inflation, domestic debt, or currency.[39] While I refer the inquisitive reader to definitions of each type of crisis in Reinhart and Rogoff (2009) for more detail on how such measures are coded, in essence my measure of *crisis year* is intended to capture other parallel crises which may also drive countries to default on their external debt.[40]

Finally, I conclude this section on potential omitted variables by noting that, in many developing countries, one serious strain on government solvency can come from sparse foreign reserves. As sovereign debt is often denominated in foreign currency, the lack of abundant foreign reserves may make debt repayment more difficult, potentially triggering sovereign debt default. In addition, as countries that have more imports are, all else equal, more likely to suffer from a trade imbalance, an observed correlation between food imports and default

[38] De Paoli and Hoggarth (2006), Reinhart and Rogoff (2009)

[39] In unreported further results, in order to address concerns of mis-specification of this measure of parallel economic crises, I have instead added each of the component elements of the crisis measure individually, or with an additive tally of the number of such crises that have occurred, as well as a principal component calculated via factor analysis. In none of these regressions were my main results of interest substantively changed.

[40] There were some country years for which the currency crisis measure was missing in the original dataset; I supplemented this measure using data on exchange rates from the Penn World Tables following the methodology in Reinhart and Rogoff (2009) of classifying currency crises as years in which change in the relative value of the currency exceeded a 15% threshold.

may simply be a result of a country importing more in general, not food imports in particular. Alternately, countries that are heavy oil producers may enjoy an advantage in generating foreign currency due to oil revenues, and if such countries either import more food or are more urbanized (such as if there is a concentration of urbanization around oil-producing regions), not controlling for oil resources may lead to spurious results.[41]

In order to address these worries, I add three additional controls to my regression analysis. First, I include directly a measure of a country's *foreign reserves*, scaled by GDP, which is drawn from the WDI; if food imports primarily affect default by consuming a large share of foreign currency, the inclusion of this control should remove any independent effect of food imports. Second, while I have followed convention in the literature so far by controlling simply for "trade" as imports plus exports over GDP, I also disaggregate this trade measure explicitly using data from the WDI on *imports* and *exports*; again, if the effect of food imports on sovereign default is nothing more than spurious correlation driven by increased imports putting greater pressure on government finances, controlling directly for total imports should do away with any effect of food imports in particular. Finally, in order to address concerns that some countries may be more likely to have additional foreign reserves due to sales of natural resources such as oil, I include a measure of *oil rents per capita.*[42]

Column 4 of Table 1 reports results including all of these potentially omitted variables to my baseline model. I begin by noting that autocracies with larger populations do appear to be somewhat more likely to default. In addition, as should be expected, countries facing some other form of economic distress are substantially more likely to default on their sovereign debt, and the coefficient on crisis year is highly statistically significant. Observe, however,

[41] Another potential omitted variable could be an interaction term between food import costs and urbanization. My formal theory suggests that the effect of food imports and urbanization on the likelihood of default may be diminished in extremely urbanized autocracies with large food import bills, where cheap food policies may be unfeasible even in the case of default. I have therefore also included in a number of specifications a measure of *food imports X urbanization.*

[42] Taken from Dunning (2008*a*).

that even after accounting for other parallel economic crises and population size, neither the substantive size nor the statistical significance of the effects of food imports and urbanization change appreciably. Nor are these effects of trivial substantive size. In the case of food imports, holding all other covariates at sample means, an increase in food import costs from 1.1% of GDP to 5.3%[43] increases the likelihood of autocratic default by 21.3 percentage points, while a similar increase in urbanization rates from 28.0% to 61.5% raises the likelihood that an autocracy will be in default by 66.7 percentage points! For sake of comparison, consider that moving from a country with virtually no debt to one with a debt-to-GDP ratio of 116% would increase the likelihood of default by 24.1 percentage points.

Concerns regarding the effect of foreign reserves, agricultural share of the economy, or oil resources, however, do not seem to be borne out by the data. Not only does the inclusion of measures of these factors not change appreciably the size or significance of the effect of food imports and urbanization, but these controls appear not to be correlated with default at any conventional level of statistical significance. Thus, at least following this initial set of robustness checks against spurious correlation, there does appear to exist a robust relationship between both urbanization rates and food imports with autocratic sovereign debt default.[44]

I have argued above, however, that due to institutional differences in the survival incentives of incumbent politicians, I do not expect to find that urban bias should help explain sovereign default in democracies. Indeed, if anything I expect that *rural biases* in democracies should better help explain cases in which they default. To assess this claim, Column 5 performs an identical regression to that in Column 4, save that I restrict analysis to the democratic subsample of countries. In accordance with my theoretical expectations, I find

[43] Moving from one standard deviation below the mean to one standard deviation above.

[44] While I do not report them here, I have also included a number of other potential controls, such as government share of total consumption, change in the exchange rate, current account balance, regime age, and past instances of default; none of these changes my main results.

that while food import costs are strongly associated with default in autocracies, they appear to have no effect on the likelihood of democratic default. In addition, as further evidence that the effect of urbanization I have identified above does indeed capture a political dynamic, I find that urban population rates are significantly *negatively* associated with default in democracies. Differences across regime types in the survival incentives of incumbent politicians may create radically different expectations for factors likely to influence default; in a companion paper I provide a much more detailed account of how rural electoral biases in democracies make such countries more likely to renege on their international borrowing agreements (Ballard-Rosa 2013).

3.2.2 Sensitivity analysis and placebo tests

Beyond those tests detailed above, I have conducted a number of other sensitivity checks on the relationship of food imports and urbanization with sovereign debt default. As in any model-based estimation approach, there are always concerns of model misspecification. While it is common in the literature to use limited dependent variable models like probit with binary dependent variables like the one in this paper, it has been suggested in Angrist and Pischke (2009) that, as OLS offers the "best" linear approximation to the conditional mean function, researchers should report OLS results unless given serious reasons to suspect that limited dependent variable models better approximate some non-linearity in the data. Additionally, while fixed effects models have become the norm in comparative and international political economy, one may still worry that that the introduction of many extra regressors may lead to non-trivial estimation difficulties, or that the combination of fixed effects with maximum likelihood models may result in biased estimates. Finally, when performing time-series cross-sectional analysis, Beck, Katz and Tucker (1998) suggests that scholars be wary of serial correlation in the data, as this introduces correlation between regressors and the error term, leading to biased estimates.

[Table 2 about here]

To address each of these concerns, I report in Table 2 re-estimation of the relationship between food imports, urbanization, and autocratic default under several different econometric modeling assumptions: Column 1 presents OLS estimates, which should provide the MMSE approximation of the CMF; Column 2 reports results using conditional logit instead of fixed-effects probit, which is not subject to the same concerns over bias arising from incidental parameters; and Column 3 presents results including a lagged dependent variable, which has been suggested as a means of capturing serial correlation in the errors (Beck and Katz 2011).[45] As can be seen, in all of these models, food imports and urbanization rates remain positive and statistically significant predictors of autocratic debt default.[46]

One might also worry that, as being in default in one year greatly increases the likelihood of being in default in subsequent years, the assumption of independence of observations is unlikely to hold; while my theory should apply equally well to years a country remains in default as to years of entering into default, perhaps my choice of dependent variable has led to estimates biased in favor of my hypotheses. An alternative specification to considering years in default, as I have above, would instead consider only new instances of default, dropping subsequent years where a country remains in default as these cases may suffer from serial dependence.[47] As demonstrated in Column 4, however, the positive and significant effects of food imports and urbanization on autocratic debt default remain even when considering this different conceptualization of the dependent variable.

[45]Except under strong assumptions, fixed-effects models with lagged dependent variables are biased due to correlation between common error terms introduced in the lagged dependent variable and the differencing required by fixed effects (Angrist and Pischke 2009). Thus, I report here estimation of my model with a lagged dependent variable but without the inclusion of fixed effects. However, it has also been suggested that this bias is of order $\frac{1}{T}$ (Beck and Katz 2011); given that I have 50 time periods, this bias should be relatively small. In unreported further tests, I have also run a fixed effect model including a lagged dependent variable, which produces virtually identical results.

[46]Results are also unchanged if I run fixed-effects logit, which does not assume normality of the error term, or random-effects probit, which does not assume constant country-level fixed effects.

[47]Beck, Katz and Tucker (1998)

While I have demonstrated continued support for a positive impact of food import costs on autocratic default, as this measure is constructed as a ratio of food import costs over GDP, it is possible that the effects I identify are driven more by changes to the denominator than changes in the numerator. In such a case, a decrease in GDP without any change in food imports would nonetheless lead to a higher food-imports-to-GDP ratio, but any correlation between higher values of this ratio and instances of debt default would be driven only by an underlying parallel economic crisis, not by years in which food import costs were actually higher. I therefore present in Column 5 results from an identical regression to my main specification, save that I scale food import costs by population size rather than by GDP. As can be seen, food imports and urbanization rates remain positively and significantly related to autocratic default, alleviating concerns that the effect I have identified is primarily driven by the scaling of my food imports measure.

[Table 3 about here]

I also conducted some "placebo" tests on my main explanatory variables of interest: I have put forward a theory of why urbanization and food imports should influence the default decisions of autocrats, but have no theory which links these factors to other economic crises. However, if these factors were also found to be positively and significantly correlated with other types of crisis, then my results may not be picking up evidence of the relationship I have proposed, but instead simply correlation between urbanization, food imports, and some sort of economic "badness" which is actually driving the defaults I observe. To test this, I re-run my baseline empirical estimation, save that I replace my outcome of interest with several other measures of economic crisis (currency, inflation, and banking), drawn from Reinhart and Rogoff (2009). As shown in Columns 1 through 3 of Table 3, food import costs are never significantly correlated with any of these other forms of economic crisis, and urbanization is only weakly correlated with banking crises but not with currency or

inflation, mitigating concerns that the robust relationship between these factors and debt default I have documented above is instead driven by a link with poor economic performance in general.

Finally, while I have already controlled explicitly for imports into a country in a given year, it may be that my measure of food imports is still primarily a proxy for increased imports generally, which drives up the current account imbalance or consumes precious foreign exchange, thereby making default more likely. In order to test whether this is true, I have constructed three additional measures of particular imports into a country in a given year: *manufacturing imports*, *arms imports*, and *fuel imports*.[48] While prices on manufacturing and arms imports are unlikely to drive urban revolt in the same way as increased food prices, many accounts of unrest in developing countries note that fuel costs are often nearly as important as food costs in the daily budget of poor people. Rapid spikes in fuel costs, such as when subsidies are removed during times of fiscal crisis, may also lead to urban unrest and, therefore, increased probability of sovereign debt default in autocracies. In support of these claims, as shown in Columns 1 and 2 of Table 4, manufacturing imports appear, if anything, to be negatively and significantly related to instances of autocratic default, whereas arms imports appear unrelated. However, in accordance with the expectations of my theory, fuel imports are positively correlated with instances of autocratic debt default, and are statistically significant at the 10% level.

[Table 4 about here]

3.3 Instrumental variables approach

The results above demonstrate that urbanization and food imports are strongly correlated with debt default in non-democracies, yet one may still worry that my measure of food

[48]Each variable is constructed in exactly the same way as my food imports measure, as described above, using data from the WDI.

import costs suffers from some other form of endogeneity for which I have failed to introduce an appropriate control. For example, suppose that there were some policy favored by certain autocracies which both encouraged food imports while also making regime finances less stable in a manner outside the logic I have previously explicated; if I have failed to control adequately for this policy choice in my estimation above, then my results may be biased by the endogeneity of food imports to this unobserved facet of particular autocracies. I present now results from my final main empirical specification in the paper, in which I make use of exogenous variation in world food commodity prices to instrument for the costs of imported food; under the assumption that changes in the world price of food do not influence default decisions other than through an effect on the costs of imported food, the use of a two-stage instrumental approach should address worries that the results I present above are driven by an endogenous regressor.[49]

I make use of data on several world food commodity prices, drawn from the World Bank's GEM Commodities dataset,[50] to instrument for the cost of food imports into a given country in a given year. After looking over food commodity imports data from the FAO listing the top 25 agricultural imports for all 70 countries in the original Reinhart and Rogoff (2009) sample, I identified six separate commodities that were commonly part of the import baskets of many countries; specifically, these six products are: wheat, rice, maize, chicken, soybean oil, and sugar.[51] In addition, as changes in world commodity prices should influence food import costs only in those countries that actually import the commodity in question, I generated country-decade dummies for each commodity which take a value of one if a given country did import a particular food commodity, and zero otherwise.[52] My excluded instruments are

[49]This instrumental strategy would not correct for problems of endogeneity in urbanization; I have unfortunately been unable to come up with an exogenous source of variation in urbanization rates that would feasibly satisfy the exclusion restriction. It is worth noting, however, that absent my theory, previous accounts would expect a negative relationship between urbanization and default.

[50]These data can be accessed at http://data.worldbank.org/data-catalog/commodity-price-data.

[51]As can be found at http://faostat.fao.org/site/342/default.aspx.

[52]To be precise, the dummy is coded as a one if, at the beginning of each decade, the commodity in

therefore constructed by interacting these decade commodity import dummies with world prices for each commodity in a particular year.

In general, when considering the use of an instrument to help deal with problems of unobserved endogeneity, there are several issues that must be addressed.[53] To begin, it is important to argue for the exogeneity of the proposed instrument; in this case, it has become common practice to take world commodity prices as beyond the control of domestic political actors, and thus not subject to endogenous manipulation. In particular, the premise of exogeneity rests on the assumption that no country in my sample has sufficient "market power" as to be able to affect world prices appreciably.[54]

A second problem in instrumental variables regression is that of "weak instruments," or cases where the proposed instrument does not sufficiently affect the endogenous regressor. The notion that world food prices should impact the cost of food imports seems relatively straightforward, especially if food demand and domestic food production take time to respond to price signals in the international market. As planting new crops and waiting for them to grow takes time, this assumption does not seem particularly egregious; in addition, while food demand may shift with changes in population size or socioeconomic status in the long run, in the short run the composition and quantity of food demand is quite inelastic, and so it should not be surprising to find that changes to world food prices affect as well the cost of imported food. More recent work on the econometric theory behind instrumental variables regression has provided researchers with statistical "benchmarks" for identifying whether problems of a weak instrument are present; as such, I always report both the first-stage coefficients on my excluded instruments, as well as a Wald F statistic from a test of

question was listed as one of the 25 top imports into a country by value.

[53] Dunning (2008*b*); Sovey and Green (2011)

[54] While this assumption may be less likely to bind in the case of major exporters who supply a preponderance of world supply of a given good, this concern is less likely to hold in the case of food import markets, since food demand is broadly distributed across the globe such that no one importing country is likely to be able to intentionally alter world prices via changed demand behavior.

their joint insignificance.[55]

Finally, in order for instrumental variables estimation to be valid, it must be true that the proposed instrument satisfies the "exclusion restriction;" the excluded instrument must affect the dependent variable only through its impact on the endogenous regressor. While it is impossible to prove whether the exclusion restriction holds in a given case, it is difficult to imagine a way that world food prices would affect an autocrat's decision to default on sovereign debt other than by impacting the cost of food brought into the country, thereby making it more difficult for autocrats to afford to provide food cheaply to their citizens. Lacking any obvious account linking world food prices to debt default outside the posited cost of food channel, the use of exogenously-determined world food prices should serve as a valid instrument for the potentially endogenous measure of food imports to a given country in a given year.

[Table 5 about here]

Column 1 of Table 5 reports the results of my two-stage estimation of the probability of sovereign debt default, instrumenting for the costliness of food imports through the use of several world food commodity prices.[56] The main results for the standard macroeconomic controls are not much changed from the non-instrumental estimation; it is still true that those countries with less trade and those facing parallel economic crises are more likely to default on their debt. Note as well that, in continued support of my theory, the effect of urbanization on default is still positive and statistically significant.

In addition, instrumenting for food imports with world food prices demonstrates that food imports are still robustly associated with increased likelihood of an autocracy being in default. This finding is replicated in Column 2, which reports results after including my

[55] As suggested by Angrist and Pischke (2009).

[56] In order to maintain interpretability with earlier analysis, the second stage is estimated as a probit model.

full set of controls. Again, both food imports and urbanization levels remain significant predictors of autocratic default; additionally, the Wald F statistic from the test of joint insignificance of my excluded instruments exceeds the suggested value of 10 in all specifications, suggesting that the first stage does not suffer from a weak instruments problem. Using exogenous variation in world food commodity prices to deal with the potential endogeneity of food imports, I reconfirm a powerful effect of both urbanization and food imports on the probability that non-democracies default on their sovereign debt.

After subjecting my main results on the positive association between food imports, urbanization, and autocratic debt default to a number of robustness checks, including controlling for omitted variables, different estimating models, re-estimation using differently specified independent and dependent variables, placebo tests on other forms of economic crisis as well as separate types of imported commodities, and use of instrumental variables for food imports, I find continued support for my hypotheses that, in non-democratic countries, more costly food imports and higher levels of urbanization are robust predictors of sovereign debt default.

4 Illustrative cases

Even the strongest case for the empirical results presented above does not prove that the mechanisms I have posited are the correct ones; in order to demonstrate that the fear of urban unrest due to increased costs of food does indeed affect default decisions by autocratic elites, I turn now to two brief historical cases of debt default in Zambia and Peru.

4.1 The Zambian Case: Default under Kaunda

4.1.1 Urban bias in Zambia

I argue above that autocrats will take citizen interests into account only when citizens can credibly threaten regime stability. While there are undoubtedly a host of features which may affect collective action capacity, urban areas should be generally more conducive to mass mobilization than rural ones, and thus autocrats should demonstrate an urban bias in the policies they implement.

Callaghy (1990, p287) notes that "Zambia started out with a high urbanization rate of 24 percent...and by 1986 had grown to an astounding 48 percent—the highest rate in black-ruled Africa;" the Zambian case is thus an excellent one for investigating the role of urban bias in autocratic policymaking. Most accounts of Zambian food policy make clear that there was, in fact, a serious urban bias, which took a number of particular forms. First, in direct accordance with the model I develop, the government exercised monopsonist marketing power for rural agricultural goods through the National Agricultural Marketing Board (Namboard); Lombard and Tweedie (1974) record that "[u]sually these boards have a monopoly, at least on the line-of-rail, and competition with the board can be and often is illegal. The Government uses the boards as an important means to manipulate production and consumption through price fixing and subsidies" (14). In addition, a centerpiece of Zambian food policy included a price subsidy on maize meal, which is the staple food of (especially urban) Zambian consumers.

Government control of food policy in Zambia took another form, again in accordance with the set-up of the model: in addition to monopolizing all marketing rights of domestic agricultural food production, Namboard as well enjoyed monopsonist importation rights in most key food commodities, including maize, vegetables, fruit, and milk.[57] In other words,

[57] *Ibid.*, p17

the government was responsible for providing food to urban areas both from rural domestic production (which was secured at reduced prices via monopsonist marketing) as well as from imports of foreign-produced food which were provided at a rate below the current world price. While the first option did not represent necessarily a direct fiscal burden on the state, subsidies on food prices, particularly on maize, constituted an increasingly large part of Zambian fiscal imbalance. For example, Loxley (1990) claims that "urban consumers have, to some extent, been shielded [from rising food prices] by subsidies on maize meal. The result has been that an increasingly large proportion of scarce budgetary funds, now in excess of 15%, is being absorbed for this purpose" (15). That these policies represented a transfer of wealth from rural to urban constituencies is perhaps best captured by the account of Zambian agricultural policy in Lombard and Tweedie (1974), which notes that "a large proportion of the subsidies allocated to the Ministry of **Rural** Development have in fact subsidized the **urban** consumer" (pp71-72, boldface in original). It seems clear that Zambian policy exhibited a strong urban bias, especially as regarded provision of cheap food to urban consumers, suggesting that Zambia should serve as a good test of my theory linking urbanization and food imports to autocratic debt default, especially during times of fiscal crisis.

4.1.2 Response to fiscal crisis in Zambia

After being burdened by heavy fiscal imbalances due to precipitous declines in the price of copper in the 1980s, the Zambian government tried to restore its fiscal health by doing away with several subsidies. Callaghy (1990) recounts the effect of removing "the subsidy on maize meal, which had become a significant fiscal drain...Serious rioting broke out in the Copperbelt in which fifteen people died. The outbursts in Lusaka itself were less serious, but still frightening. Badly shaken by the riots, President Kaunda immediately reversed the maize price increase and nationalized all the large private maize mills" (296). Attempts by

the Zambian government to remove subsidies on maize meal were met with massive revolts, including in the capital, which left the government "badly shaken" and thus prompted policy reversal on these fronts. This fits well the picture of a regime caught between budgetary demands necessitating economic adjustment for continued access to borrowing, and angry urban citizens willing to take to the streets to protest rapidly rising food prices.

Caught in such a dilemma, a self-interested politician concerned with remaining in power might rationally refuse to implement economic adjustment, especially if the government viewed citizen unrest as damaging to regime stability. With elections scheduled for 1988, Kaunda may have been particularly sensitive to the potential for urban unrest to threaten his rule.[58] In fact, Callaghy (1990) argues that "Zambian officials believed that the elections were crucial to the legitimacy, *and thus the stability*, of the single-party state [and that] a severe embarrassment in the elections might foster divisive and centrifugal political and social tendencies" (296, emphasis added). The Zambian government at the time viewed food price riots explicitly in terms of their potentially destabilizing impact, and facing such pressure, Kaunda chose to call off reforms intended to improve budgetary balances and continue debt servicing. After doing so, access to international financial resources was essentially stopped, and "[f]inally, on May Day 1987, President Kaunda announced that Zambia was suspending its IMF reform effort, abolishing the auction, freezing prices, reintroducing price controls, resurrecting the import licensing system of allocating foreign exchange, and limiting debt service to well under 10 percent of foreign exchange earnings" (298). In other words, when faced with the threat of regime instability driven by urban riots against rising food prices due to economic adjustment, the Zambian government chose instead to renege on its international borrowing agreements, and defaulted on its sovereign debt.

[58]These were not multiparty elections, and thus the case is still coded as an autocracy.

4.2 Peru

While many of the most famous cases of debt default occurred in Latin America during the early 1980s, attempts to explain these default instances often run up against the problem of disentangling domestic political and economic factors from issues of "contagion" from abroad. In this regard, early debt troubles in Peru (beginning in 1975-1976) are ideal insofar as they occur before the broader wave of Latin American defaults, and are therefore much less likely to be driven simply by changed international conditions following large defaults by neighbors in the region. In addition, several scholarly accounts of the "austerity protests" which swept through the developing world note that the first major instance of such mass mobilization against economic correction took place in Peru in 1976, and so the case of Peru seems an excellent one for investigating the relationship between urbanization, protest, and default.[59]

4.2.1 Urban bias in Peru

Similar to the Zambian case discussed above, Peru underwent a massive demographic shift over the course of the middle of the twentieth century; as noted in Smith (1988), the "proportion of urban dwellers in Peru has grown from less that a quarter in 1940 to well over half (56.2%) in 1981. More dramatically, the number of people in towns has increased from about 1.5 million in 1940 to 9.6 million in 1981" (34). Additionally, this change was marked by a concentration of the population in the capital city, Lima; given that my theory depends on the credibility of urban revolt threatening autocratic regime stability, the presence of a large and densely packed urban group of citizens nearby the seat of government power makes this threat much more tangible.[60]

As regards food policy in particular, several accounts make clear that, by providing

[59] Walton (1989), Walton and Seddon (2008)
[60] As argued by Wallace (2012).

cheaply subsidized food to urban consumers, the Peruvian government engaged directly in a transfer of wealth from rural to urban citizens. Rudolph and Ciccarelli (1993) notes explicitly, for example, that "those [rural producers] supplying domestic markets were additionally hurt by policies designed to keep food prices low for the benefit of urban consumers" (64). In addition, while the government engaged in a project of "agricultural reform" beginning in 1969, it became clear subsequently that the real purpose of this "reform" was elimination of bands of rural elites that could have posed a threat to the political regime; in terms of actual policy that favored rural producers, Thorp (1991) observes that "no major effort was made to improve the availability of agricultural extension services...while the provision of rural credit was assigned low priority [and] at least one vital input—fertilizer—remained in short supply" (81). Against this general neglect of poor rural producers, Thorp (1991) continues by noting that "to complete the picture, urban food prices were judged to be politically sensitive and were kept low, which in the absence of compensating subsidies to local producers served to perpetuate the long-run unfavorable trend of the rural-urban terms of trade."[61] It should not be surprising, therefore, to find that by the mid-1970s, Peru had become heavily dependent upon the import of foreign-produced food to meet the demand of a growing urban population. As "agrarian reform" in Peru essentially amounted to dismantlement of potential challengers to political rule while ignoring the real needs of impoverished rural farmers, at the same time that government was incurring fiscal losses by subsidizing cheap food for urban citizens, it seems clear that policy under the Peruvian autocracy did exhibit a marked urban bias, making it a good case to test the impact of urbanization and food imports on autocratic debt default.

[61] *Ibid.*

4.2.2 Response to fiscal crisis in Peru

In response to the onset of fiscal crisis that struck Peru beginning in 1975, while government at first tried various "palliative" measures, it soon became clear that serious structural imbalances existed in Peru. In an attempt to correct these imbalances (in large part in hopes of securing further foreign lending), the government in 1976 introduced an austerity package which included "tax increases and subsidy cuts that sharply raised the prices of foodstuffs. The austerity program led to widespread demonstrations and a wave of strikes."[62] After losing access to external banking in 1976, the government was forced again to return to the IMF in 1977 to seek further loans. Under pressure from the Fund to "cut all subsidies,"[63] the government attempted yet another round of austerity. However, these efforts to rein in imbalances "by increasing food and petrol prices...provoked major riots in a number of provincial cities [and] with the first general strike in twenty years, in July 1977, the stabilization policy appeared to dissolve into incoherence, price increases were rescinded, negotiations with the Fund were broken off and the Central Bank team resigned."[64] Finally, in a last ditch effort to prevent default, the Peruvian government managed to reach a temporary agreement with the IMF in October of 1977 in which subsidies and petrol prices were allowed to remain untouched in exchange for promises of a massive reduction in government spending; when by early 1978 it became clear that the Peruvian government was neither willing to reduce defense spending nor do away with costly food policies, negotiations finally broke down, moving Peru into default. The case of default in Peru in 1978 thus offers further evidence that urban-biased autocracies, when faced with fiscal crisis, may prefer to default on their sovereign debt as opposed to undoing costly policies designed to keep food cheap for urban consumers.

[62] Beckerman (1988, p119)
[63] *Ibid.*
[64] Thorp (1991, p85)

5 Conclusion

What explains sovereign debt default in autocracies? The theory I develop above suggests that autocratic elites are unlikely to undergo the painful austerity needed to restore fiscal balance when such measures threaten the provision of cheap food to densely concentrated urban actors. In addition, as importation of foreign-produced food which is sold at a loss to urban markets represents an additional drain on government resources, those autocracies that face urban unrest following food price increases are likely to worry about their tenure in office. When given the choice between long run borrowing costs and short run survival costs, self-interested autocrats may prefer to default on their debt, rather than enforce economic correction.

I demonstrate in this paper robust empirical support for the main implications of my argument: using several different estimation techniques and controlling for a host of alternative explanations, I find that urbanization and food imports are both consistently associated with years of default in autocracies. These results are reconfirmed when, in order to allay concerns of potential endogeneity, I instrument for food imports using exogenous variation in world food commodity prices, and continue to find a robust relationship between food imports, urbanization, and autocratic sovereign debt default.

These findings are important for at least three main reasons. First, they are derived from the first theory of debt default which focuses explicitly on the survival concerns of autocratic leaders. In focusing on the political economy of autocracies facing fiscal crisis, the paper also introduces two factors to be considered in empirical analysis of sovereign debt default which have previously been completely ignored: food import costs and levels of urbanization, both of which are shown to be strongly robust correlates of years in default in autocracies, even after controlling for a battery of standard macroeconomic predictors. Finally, these results reconfirm that urban-rural divides are an important component of political struggles

in autocracies. In ongiong work, I synthesize all three sets of advantages in turning to the political economy of sovereign deft default in the democratic setting as well (Ballard-Rosa 2013). Given the current state of European debt, not to mention the broader international trend towards economic adjustment in the face of binding fiscal constraints, this topic is sure to prove of interest to scholars and practitioners alike for the foreseeable future.

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A Derivation of equilibrium outcomes

A.1 Citizen indirect utility

Given the equations for citizen utility and income above, the maximization problem for consumers can be represented by the following Lagrangian

$$\mathcal{L}_i(.) = x + ln(b) - \lambda(x + (\pi - \phi)b - y_i) \tag{11}$$

Solving the first order conditions, optimal food consumption for any agent i is given by

$$b_i^* = \begin{cases} \frac{1}{\pi - \phi} & \text{if } y_i \geq 1 \\ \frac{y_i}{\pi - \phi} & \text{otherwise} \end{cases} \tag{12}$$

In other words, for any agent with income greater than or equal to one, that agent would like to spend exactly one "dollar" on food (since $b_i^* p = (\pi - \phi)^{-1}(\pi - \phi) = 1$) and the rest on other consumption. However, when an agent's income falls below one, this pushes food consumption to the "corner solution" where the agent spends her entire income on food. Given this, optimal non-food consumption is similarly defined as

$$x_i^* = \begin{cases} y_i - 1 & \text{if } y_i \geq 1 \\ 0 & \text{otherwise} \end{cases} \tag{13}$$

A.2 Derivation of food subsidy costs

As total food demand depends on the income level of both urban and rural consumers, I separate discussion of the costliness of a food subsidy according to four possible cases, evaluating determinants of food subsidy costs when urban and rural citizens are either able or unable to afford their preferred level of food consumption.

A.2.1 Case I: $\bar{x} \geq 1$ and $\pi\bar{b} \geq 1$

When both groups can afford to spend at least one dollar on food, then total food demand $\hat{b}$ is given by

$$\hat{b} = \alpha\frac{1}{\pi - \phi} + (1-\alpha)\frac{1}{\pi - \phi} \Leftrightarrow \hat{b} = \frac{1}{\pi - \phi} \tag{14}$$

Note, as should be expected, that total food demand will be determined in part by the government's food subsidy. As such, for a given world price π, the government should select the lowest food subsidy that still guarantees that $\hat{b} \geq \tilde{b}$, which in equilibrium should hold with equality. In other words, the government wants to select some $\tilde{\phi}$ such that

$$\hat{b} = \tilde{b} \Leftrightarrow \frac{1}{\pi - \tilde{\phi}} = \tilde{b} \Leftrightarrow \tilde{\phi} = \pi - \frac{1}{\tilde{b}} \tag{15}$$

Given this subsidy level,[65] I can now compute the level of imports directly, which are given by

$$\beta(\tilde{\phi}) = \hat{b} - (1-\alpha)\bar{b} \Leftrightarrow \beta(\tilde{\phi}) = \tilde{b} - (1-\alpha)\bar{b} \tag{16}$$

Under these conditions, it is clear that the amount of food imported is increasing in the size of the urban population; in other words, $\partial\beta(.)/\partial\alpha > 0$. As such, the total cost of the food subsidy to the government is given by

$$C(\tilde{\phi}) = \tilde{\phi}\beta(\tilde{\phi}) \Leftrightarrow C(\tilde{\phi}) = \pi\tilde{b} - 1 - \pi(1-\alpha)\bar{b} + \frac{(1-\alpha)\bar{b}}{\tilde{b}} \tag{17}$$

Observe that the costliness of the minimum feasible subsidy is increasing in the size of the urban population ($\partial C(.)/\partial\alpha > 0$), in the world price of food ($\partial C(.)/\partial\pi > 0$), and also in

[65] An attentive reader may be concerned that the cut-off I have used for the case above may be violated perhaps at $\tilde{\phi}$, insofar as a relatively high food subsidy could push rural income below one and thus would change the equation for total food demand I am using. Note, however, that this still holds true so long as $(\pi - \tilde{\phi})\bar{b} \geq 1$, which is equivalent to $\bar{b} \geq \tilde{b}$, a condition I have already assumed above, and so I do not need to worry about this potential concern here.

the level of the hunger threshold ($\partial C(.)/\partial \tilde{b} > 0$). On the other hand, as should be expected, when domestic food production is higher, the costliness of food subsidies should be reduced, as a larger share of food demand can be met via domestic markets ($\partial C(.)/\partial \bar{b} < 0$).

A.2.2 Case II: $\bar{x} \geq 1$ and $\pi\bar{b} < 1$

If only urban consumers can afford to spend a full dollar on food, whereas rural farmers turn to "subsistence" and thus instead simply consume their own production, total food demand is given by

$$\hat{b} = \alpha \frac{1}{\pi - \phi} + (1 - \alpha)\bar{b} \tag{18}$$

In this case, with all domestic production consumed by subsistence farmers, only urban food demand is sensitive to subsidy levels; as such, in order to secure urban quiescence, the autocrat will find the cheapest subsidy that still keeps urban consumers above the starvation threshold. This is given when

$$\frac{\alpha}{\pi - \tilde{\phi}} = \alpha\tilde{b} \Leftrightarrow \tilde{\phi} = \pi - \frac{1}{\tilde{b}} \tag{19}$$

Observe that this is the same minimum subsidy as in Case I. However, the total costliness of this subsidy will differ, as now all urban food must be imported, whereas in the previous case at least some of the demand may have come from domestic producers as well. In this case, the costliness of food subsidies to the government is

$$C(\tilde{\phi}) = \tilde{\phi}\beta(\tilde{\phi}) \Leftrightarrow C(\tilde{\phi}) = \alpha(\pi\tilde{b} - 1) \tag{20}$$

As in Case I, the costliness of food subsidies is increasing in urbanization, the world price of food, and the level of the hunger threshold.[66]

[66] Again, $\partial C(.)/\partial \alpha > 0$, $\partial C(.)/\partial \pi > 0$, and $\partial C(.)/\partial \tilde{b} > 0$. However, note that, unlike in Case I, in this situation the costliness is not affected by domestic production, as all domestic food is consumed by

A.2.3 Case III: $\bar{x} < 1$ and $\pi\bar{b} \geq 1$

In the case where urban consumers cannot afford their ideal (unconstrained) food amount, they will instead spend their entire income procuring food; so long as rural producers can afford to spend one dollar on food, they will do so.[67] This gives total food demand of

$$\hat{b} = \frac{\alpha\bar{x} + (1-\alpha)}{\pi - \phi} \tag{21}$$

Of course, the autocrat's best response will still be to find the subsidy level that sets urban consumption just above starvation; this is achieved for some $\tilde{\phi}'$ such that

$$\frac{\alpha\bar{x}}{\pi - \tilde{\phi}'} = \alpha\tilde{b} \Leftrightarrow \tilde{\phi}' = \pi - \frac{\bar{x}}{\tilde{b}} \tag{22}$$

Given this value of $\tilde{\phi}'$, food imports are calculated as

$$\beta(\tilde{\phi}') = \alpha\tilde{b} + (1-\alpha)(\frac{1}{\pi - \pi + \frac{\bar{x}}{\tilde{b}}}) - (1-\alpha)\bar{b} \Leftrightarrow \beta(\tilde{\phi}') = \alpha\tilde{b} + (1-\alpha)(\frac{\tilde{b}}{\bar{x}} - \bar{b}) \tag{23}$$

which sets the total cost of food subsidies as

$$C(\tilde{\phi}') = \tilde{\phi}'\beta(\tilde{\phi}') \Leftrightarrow C(\tilde{\phi}') = (\alpha\tilde{b} + (1-\alpha)(\frac{\tilde{b}}{\bar{x}} - \bar{b}))(\pi - \frac{\bar{x}}{\tilde{b}}) \tag{24}$$

In this world, it is still true that the costliness of food imports is increasing in the world price of food and in the hunger threshold; however, given an economy characterized by exceptionally impoverished urban workers and relatively well-off rural farmers, there does exist a segment of the parameter space[68] where, due to greater food demands by wealthy

subsistence farmers. However, insofar as increases in $\bar{b}$ could push $\pi\bar{b} \to 1$, this could lead to a shift from Case II to Case I, in which case domestic food production would again reduce the costliness of food imports.

[67] Technically, this is defined as the range where $\bar{x}\bar{b} > \tilde{b}$.

[68] Formally, whenever $\bar{x} < \tilde{b}/(\tilde{b} + \bar{b})$.

rural actors than by poor urban dwellers, the need for food imports actually decreases in the size of the urban population (that is, $\partial\beta(.)/\partial\alpha < 0$ for this range). However, given that such a world would likely be characterized by rural-biased elites not considerably threatened by urban unrest in the first place (otherwise, it would be difficult to understand how such a group of wealthy farmers could exist in parallel to an impoverished urban mass), I find it sensible that such a world must be considered a boundary case on the relevant universe where my theory that increased urbanization increases the likelihood of default by an autocrat fearful of urban unrest should apply.

A.2.4 Case IV: $\bar{x} < 1$ and $\pi\bar{b} < 1$

Finally, in a world where no citizen group can afford one dollar on food expenditures, urban actors will dedicate their full income to food procurement, while rural actors will simply consume their own food production. Thus, total food demand is given by

$$\hat{b} = \frac{\alpha\bar{x}}{\pi - \phi} + (1 - \alpha)\bar{b} \tag{25}$$

As above, the autocrat will seek the minimum feasible subsidy that still secures urban quiescence; this is achieved for some $\tilde{\phi}'$ such that

$$\frac{\alpha\bar{x}}{\pi - \tilde{\phi}'} = \alpha\tilde{b} \Leftrightarrow \tilde{\phi}' = \pi - \frac{\bar{x}}{\tilde{b}} \tag{26}$$

Observe that this is the same subsidy as in Case III. Given this value of $\tilde{\phi}'$, and with total food imports equal to $\alpha\tilde{b}$ (since rural farmers consume all domestic production, the entirety of urban food must be imported), this gives a total cost of food subsidies of

$$C(\tilde{\phi}') = (\pi - \frac{\bar{x}}{\tilde{b}})\alpha\tilde{b} \tag{27}$$

As is to be expected, the costliness of food subsidization is increasing in the fraction of the population which is urban, the world price of food, and the level of the hunger threshold.[69]

[69]That is, $\partial C(.)/\partial \alpha > 0$, $\partial C(.)/\partial \pi > 0$, and $\partial C(.)/\partial \tilde{b} > 0$. Again, just as in Case II, the costliness of food imports is not affected by domestic production, as all domestic food is consumed by subsistence farmers. However, insofar as increases in $\bar{b}$ could push $\pi\bar{b} \to 1$, this could lead to a shift from Case IV to Case III, in which case domestic food production would again reduce the costliness of food imports.

B Tables and Figures

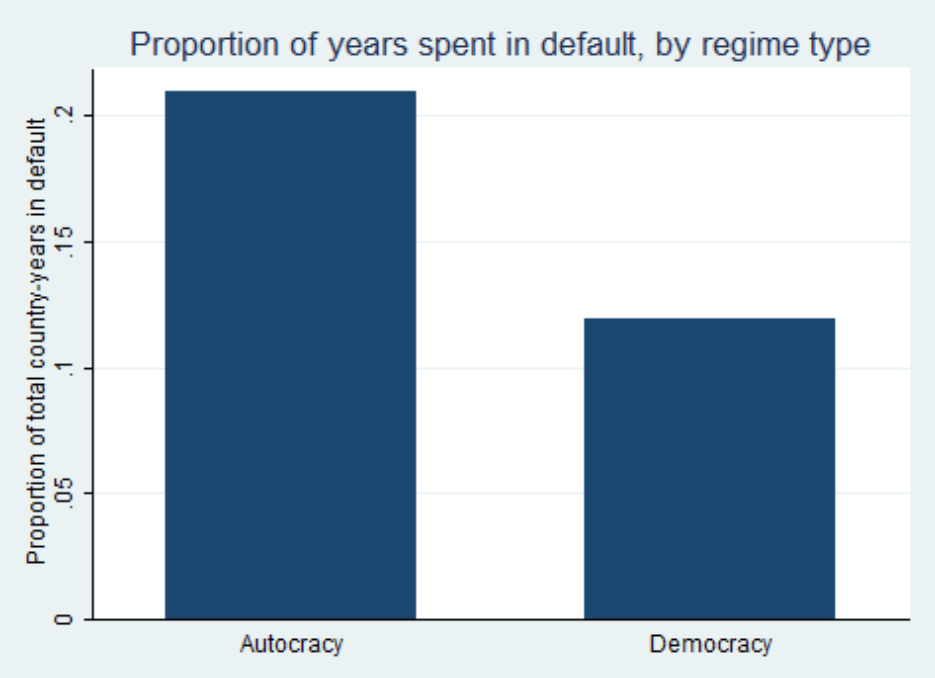

Figure 1: *Proportion of country-years spent in default.*

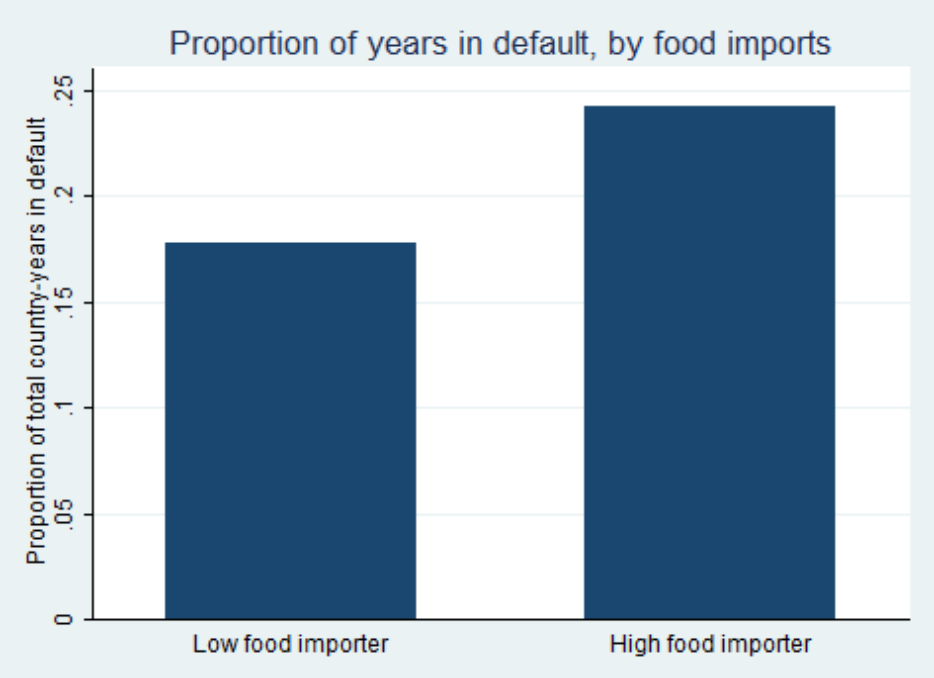

Figure 2: *Proportion of years spent in default, by food imports.*

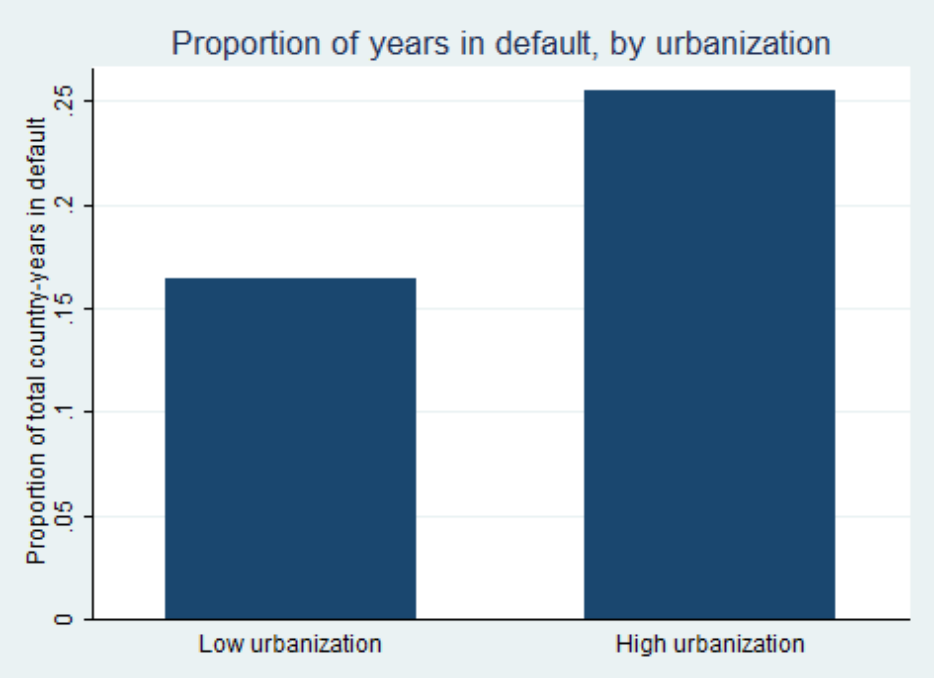

Figure 3: *Proportion of years spent in default, by urbanization.*

VARIABLES	(1) Probit	(2) Probit	(3) Probit	(4) Probit	(5) Probit
Food imports	27.095***		22.895***	69.938***	-8.497
	(8.123)		(9.807)	(26.317)	(39.037)
Urbanization (% total pop.)		0.075**	0.106**	0.156**	-0.1***
		(0.034)	(0.047)	(0.069)	(0.042)
GDP per capita (logged)			0.007	0.472	0.77*
			(0.27)	(0.395)	(0.418)
Δ GDP			-6.37e-12**	-1.88e-12	-5.02e-12
			2.80e-12	3.50e-12	4.70e-12
Debt/GDP			0.013***	0.012**	0.023***
			(0.005)	(0.005)	(0.005)
Trade			-0.02**		
			(0.009)		
Inflation			0.432		
			(0.289)		
Imports/GDP				-0.043**	-0.024
				(0.021)	(0.026)
Exports/GDP				0.027	0.035
				(0.023)	(0.028)
Crisis year				1.414***	0.853***
				(0.224)	(0.202)
Population (logged)				4.084**	5.114***
				(2.074)	(1.927)
Oil rents (per capita)				-0.002	.0003496
				(0.002)	.0004407
Foreign reserves				-4.839*	-7.4***
				(2.543)	(2.942)
Agr. share of econ.				0.041	0.028
				(0.025)	(0.026)
Food x Urban				-0.867	0.127
				(0.554)	(0.706)
Constant	-3.327***	-4.665***	-7.677***	-52.88***	-71.651***
	(0.756)	(1.068)	(1.882)	(19.811)	(25.372)
Observations	995	995	995	995	738
Number of countries	33	33	33	33	26

*** p<0.01, ** p<0.05, * p<0.1

Table reports estimates of probit regressions of *years in default* on *food imports over GDP* and *urbanization*, as well as several controls, for non-democracies (in Columns 1-4) and democracies (Column 5) from 1960-2009. The table reports multiple imputation estimates of the probit coefficients for each variable and robust standard errors, clustered at the country level, in parentheses. Country and year fixed effects were included in each regression, but are suppressed for presentation.

VARIABLES	(1) OLS	(2) Cond. Logit	(3) Lagged DV	(4) Alt. DV	(5) Food/pop.
Food imports	7.167*	106.249***	15.535*	117.795***	
	(3.842)	(35.918)	(8.79)	(38.701)	
Urbanization (% total pop.)	0.017***	0.238***	0.023***	0.219***	0.119**
	0.006	0.082	0.008	0.089	0.054
GDP per capita (logged)	0.008	-0.717	-0.019	0.071	-0.649
	0.061	0.928	0.104	0.811	0.455
Δ GDP	-4.71e-13	-5.97e-12	-1.29e-13	2.83e-12	-4.14e-12
	3.84e-13	6.13e-12	2.75e-12	1.70e-11	4.09e-12
Debt/GDP	0.002***	0.022***	0.004***	0.004	0.014***
	.0003822	0.006	0.002	0.005	0.003
Imports/GDP	-0.007***	-0.102***	-0.009	-0.097***	-0.042**
	0.003	0.03	0.008	0.034	0.02
Exports/GDP	0.005*	0.063*	0.008	0.071	0.024
	0.003	0.033	0.008	0.044	0.021
Crisis year	0.194***	2.345***	0.369***	1.239***	1.498***
	0.042	0.396	0.122	0.325	0.237
Population (logged)	0.618***	5.399***	-0.037	2.093	2.637
	0.218	(1.746)	0.066	(2.89)	(1.869)
Oil rents (per capita)	-.0004531***	-0.004**	.0000487	0.002	-0.002
	.0001791	0.002	.0004543	0.002	0.002
Foreign reserves	-0.082	-6.284*	-3.203***	-12.352**	
	0.254	(3.75)	(1.289)	(5.66)	
Agr. share of econ.	0.006	0.032	0.007	-0.027	
	0.005	0.035	0.007	0.045	
Food x Urban	-0.091	-1.112	-0.3	-1.969**	
	0.095	0.784	0.211	0.934	
Lagged DV			2.39***		
			0.196		
Food imports/pop.					.0000436*
					.0000254
Food/pop. x Urban					-7.16e-07**
					3.60e-07
Constant	-6.805***		-2.482***	-39.469***	-28.869
	(1.995)		0.942	(14.168)	(18.201)
Observations	1,229	1,229	995	405	995
Number of countries	43	43	33	31	33

*** p<0.01, ** p<0.05, * p<0.1

Columns 1 and 2 report estimates of regressions of *years in default* on *food imports over GDP* and *urbanization*, as well as many controls, for non-democracies from 1960-2009; the estimating model varies by column and is listed in the column header. Column 3 reports estimates from probit regression on the same covariates with an included lagged dependent variable. Column 4 reports estimates from a probit regression of *default instances* on *food imports over GDP* and *urbanization*, as well as many controls, for the same sample. Column 5 reports estimates of probit regression of *years in default* on *food imports over population* and *urbanization*, as well as several controls, for the same sample. The table reports multiple imputation estimates of regression coefficients for each variable and robust standard errors, clustered at the country level, in parentheses, with bootstrapped standard errors in the conditional logit model. Country and year fixed effects were included in Columns 1, 4, and 5, but are not reported.

VARIABLES	(1) Currency	(2) Inflation	(3) Banking
Food imports	-14.428	0.108	25.907
	(19.031)	(20.213)	(28.293)
Urbanization (% total pop.)	0.019	0.028	0.103*
	(0.045)	(0.049)	(0.054)
GDP per capita (logged)	-0.002	-1.056***	-0.182
	(0.291)	(0.44)	(0.44)
Δ GDP	-3.33e-12	-1.99e-12	7.85e-13
	2.35e-12	3.15e-12	1.76e-12
Debt/GDP	0.005*	0.004	0.003
	(0.003)	(0.004)	(0.002)
Trade	-0.009	-0.005	0.003
	(0.006)	(0.01)	(0.006)
Inflation	0.807***		0.663***
	(0.231)		(0.26)
Food x Urban	0.483	0.462	-0.626
	(0.472)	(0.464)	(0.709)
Constant	-2.776	-0.383	-11.356***
	(2.586)	(2.519)	(0.642)
Observations	640	1,114	713
Number of countries	29	36	24

*** p<0.01, ** p<0.05, * p<0.1

Columns 1-3 report estimates of probit regressions of three alternate types of economic crisis, as listed in the column header, on *food imports over GDP* and *urbanization*, as well as several controls, for autocracies from 1960-2009. The table reports multiple imputation estimates of the regression coefficients for each variable and robust standard errors, clustered at the country level, in parentheses. Country and year fixed effects were included in each regression, but are not reported.

VARIABLES	(1) Manuf.	(2) Arms	(3) Fuel
Manuf. imports	-4.69*		
	(2.594)		
Arms imports		0.057	
		(3.272)	
Fuel imports			13.942*
			(7.581)
Urbanization (% total pop.)	0.103***	0.106***	0.101***
	0.041	0.043	0.042
GDP per capita (logged)	-0.723	-0.81*	-0.723
	0.473	0.463	0.476
Δ GDP	-5.62e-12	-5.97e-12	-5.23e-12
	3.81e-12	3.76e-12	3.69e-12
Debt/GDP	0.014***	0.014***	0.014***
	0.003	0.003	0.003
Imports/GDP	-0.004	-0.022	-0.036**
	0.021	0.016	0.016
Exports/GDP	0.003	0.002	0.008
	0.019	0.018	0.018
Crisis year	1.469***	1.513***	1.533***
	0.215	0.219	0.221
Constant	-2.174	-1.693	-2.015
	(3.529)	(3.523)	(3.676)
Observations	995	995	995
Number of countries	33	33	33

*** p<0.01, ** p<0.05, * p<0.1

Table reports estimates of probit regressions of *years in default* on either *manufacturing imports over GDP* (Column 1), *arms imports over GDP* (Column 2), or *fuel imports over GDP* (Column 3), as well as several controls, for autocracies from 1960-2009. The table reports multiple imputation estimates of the probit coefficients for each variable and robust standard errors, clustered at the country level, in parentheses. Country and year fixed effects were included in each regression, but are not reported.

VARIABLES	(1) Baseline	(2) Full controls
Food imports	64.764**	82.12***
	(29.245)	(24.223)
Urbanization (% total pop.)	0.097**	0.086*
	0.049	0.05
GDP per capita (logged)	0.334	0.723*
	0.312	0.383
Δ GDP	-2.64e-12	-1.18e-12
	2.71e-12	3.03e-12
Debt/GDP	0.008	0.008
	0.006	0.006
Trade	-0.026***	
	0.009	
Imports/GDP		-0.072***
		0.02
Exports/GDP		0.035*
		0.02
Crisis year	1.392***	1.109***
	0.353	0.363
Population (logged)		2.583
		(1.788)
Oil rents (per capita)	-0.003*	-0.003**
	0.002	0.001
Foreign reserves		-3.796*
		(2.271)
Agr. share of econ.		0.042*
		0.023
Wheat imports x Price	.0000232**	.0000208*
	.0000111	.0000119
Rice imports x Price	4.20e-06	5.52e-06*
	3.21e-06	3.20e-06
Maize imports x Price	1.82e-06	-2.93e-07
	9.73e-06	.0000107
Chicken imports x Price	.0000583	.0000585*
	.0000381	.0000346
Soybean oil imports x Price	5.89e-06***	4.89e-06**
	2.10e-06	2.24e-06
Sugar imports x Price	.0000347	.0000479*
	.0000289	.0000289
Wald F stat	20.76	18.74
Observations	995	995

*** p<0.01, ** p<0.05, * p<0.1

The top section of the table reports estimates from two-stage regression of *years in default*, instrumenting for *food imports over GDP* through the use of several food commodity prices in the first stage, on *urbanization* and several controls, for autocracies from 1960-2009. The bottom section of the table reports coefficient estimates for the excluded instruments in the first stage, as well as the Wald F stat from a test of joint insignificance for these instruments. The table reports multiple imputation estimates of the probit coefficients in the second stage and OLS coefficients in the first stage for each variable and robust standard errors, clustered at the country level, in parentheses. Country and year fixed effects were included in each regression, but are not reported.

C ONLINE APPENDIX

C.1 Multiple Imputation

While I had no missing data for my dependent variable on external sovereign default or my explanatory variable on urbanization rates, and very limited missingness for my other main explanatory variable on food imports (approximately 15% missing), I found that once I combined measures on all the standard macroeconomic controls for debt default, there existed non-trivial amounts of missing data scattered across different countries and years for these controls. While it is common in such cases to simply drop all observations for which at least one covariate is missing, this process of "listwise deletion" can suffer both from statistical inefficiency (if relevant information for the analysis is tossed away) as well as the more serious problem of bias (if those observations for which some measures are missing differ in a systematic fashion from those with full coverage).

The standard alternative approach to listwise deletion in the literature is to employ "multiple imputation," a procedure which generates several imputed sets of complete data and subsequently combines estimates of coefficients and variance computed across these imputed datasets in a consistent manner under a few relatively weak assumptions. Primarily, it must be assumed that the data generating process for any missing data is random conditional on data included in the imputation process. This is generally referred to as cases where data are *missing at random*, or *MAR*; under *MAR*, multiple imputation returns consistent parameter estimates and accurate measures of uncertainty that account both for normal within-sample variation, as well as between-sample variation due to uncertainty in the imputation stage. While it is impossible to verify the validity of this assumption, I have included a fairly exhaustive set of covariates in the imputation stage, including measures for economic crisis, domestic conflict, political change, and a host of other factors likely to systematically affect data missingness.

In general, multiple imputation involves first generating $m > 1$ complete datasets via some imputation procedure; in my case, I followed much previous work in using *Amelia II: A program for missing data* to impute 5 separate datasets.[70] After imputing these 5 datasets, I subsequently used standard statistical estimation methods (such as probit regression) in *Stata* to generate coefficient estimates and standard errors on each of the 5 datasets, which were finally combined using Kenneth Scheve's *miest* program. The resulting multiple imputation coefficients are simply the arithmetic mean of the coefficient estimates from each of the 5 imputed datasets, while the multiple imputation variance estimates account for both standard within-sample variation in the 5 imputed datasets, as well as between-sample variation in the estimates across each of the imputed datasets.[71]

In order to assess the validity of the imputation stage, I have performed several common imputation diagnostics. The first, known as "overimputation," assesses how well the imputation process does in predicting data that exist as though they were missing; that is, while we obviously cannot compare imputed missing data against their "true" value (else the data would not be missing in the first place!), we can see how closely the imputation algorithm comes to reproducing correct values for the data we actually have. In order to do this, I re-ran the identical imputation procedure described above, save that I subsequently dropped one observation at a time for which I had full data and imputed the missing value, as well as the 90% confidence interval around this imputation. If we then compare these imputed values against the true value which was temporarily dropped, we should hope to find that plots of the imputed values against the true values should fall mostly along the 45 degree line. Indeed, as can be seen in Figure 4 below, the imputation process worked extremely well in correctly imputing data on food import costs that I have (when they were considered

[70] While the interested reader should consult Honaker and King (2010) for specifics of the imputation process, *Amelia* essentially combines Bayesian expectation maximization procedures with a bootstrapping algorithm to generate draws on the posterior density in order to impute missing data.

[71] See King et al. (2001) for specifics on the calculation of variance in multiple imputation.

missing), save for two extreme outliers of country-years when food imports constituted over 15% of GDP.

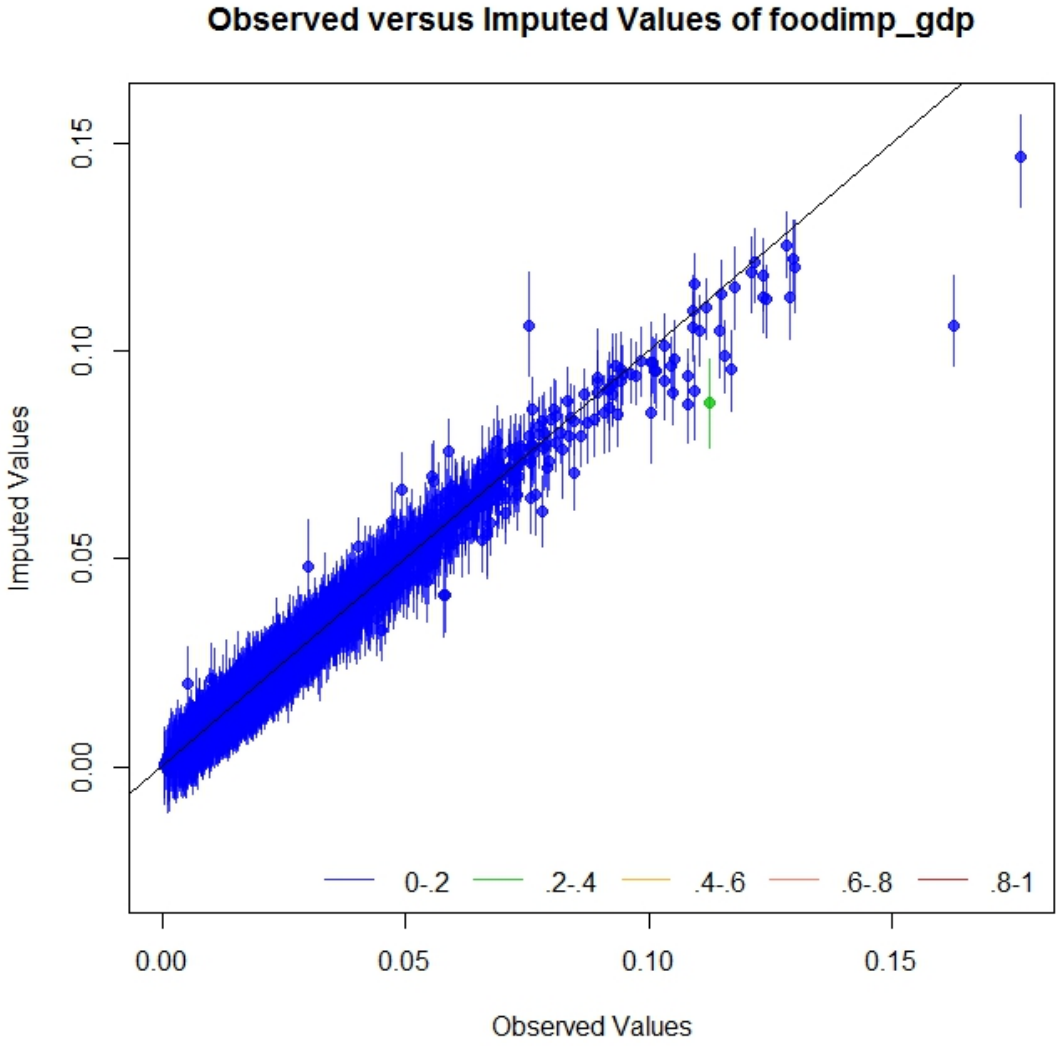

Figure 4: *Overimputation of food imports.*

Another common postimputation diagnostic helps assess whether the likelihood convergence achieved during the imputation procedure is the result of some errant starting point (such as if there exist local maximization values for a maximum-likelihood search grid function which differ from the global maximum). In order to verify that these coefficients are not

simply statistical flukes, I have also conducted an "overdispersion" exercise which runs the expectation maximization algorithm starting at several different and widely dispersed seed values. While it is difficult to show these results in a multidimensional parameter space, I have followed standard practice by evaluating convergence relative to the largest principle component of the final mode (see Honaker, King and Blackwell (2011)). As can be seen in Figure 5, each of the EM chains from different starting values converge to the same mode, which helps assuage worries that the imputation results are the outcome of a particular starting value under a poorly-behaved likelihood function.

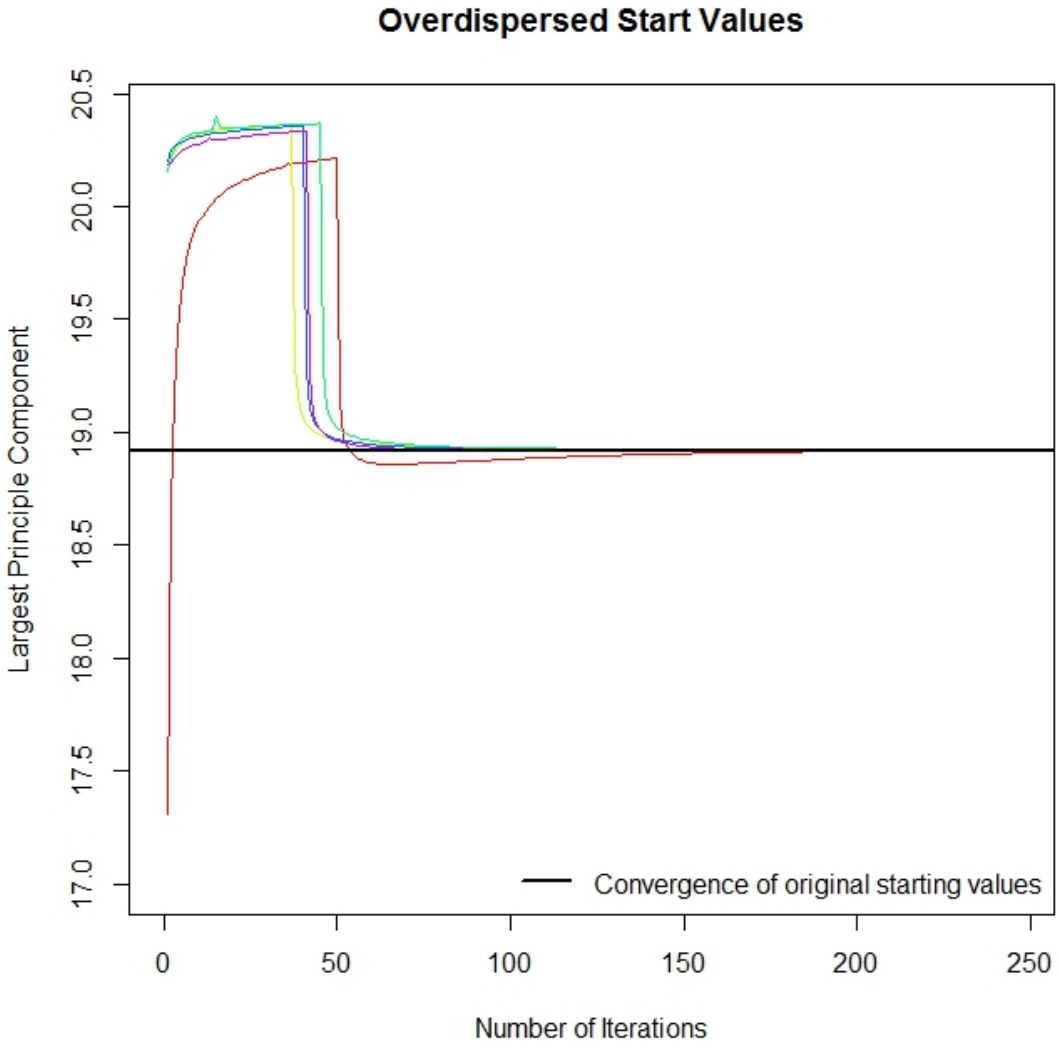

Figure 5: *Convergence of overdispersed multiple imputations.*

C.2 Democratic political preferences

While citizen ideal policies are known with certainty, I assume that there exists some uncertainty in newly democratized nations as to what exactly will be the democratic outcome of an election.[72] As such, it will be necessary to determine what each group's ideal democratic subsidy would be, as well as define expectations over democratic policymaking, which I derive below.

I begin by specifying expected outcomes of democratization, starting with urban preferences. As defined above, urban utility is increasing monotonically in food subsidies. To see this, note that the derivative of $v_U(\phi) > 0$ for all cases of urban consumption; that is, $\partial v_U(.)/\partial\phi > 0 \,\forall\, b_U$.[73] Thus, given urban preferences for higher values of ϕ, it is clear that, so long as there exists a feasible subsidy to secure at least subsistence consumption of food, urban citizens will wish to set the highest feasible food subsidy. However, in cases where this is no longer true, pressures to revolt will be limited; that is, when urban ideal subsidies would be infeasible even in a democracy, the appeal of mobilization for democratic transition should be weakened.

Calling the maximum feasible subsidy in the case of "austerity" (which is required in order to faithfully repay international lenders) $\bar{\phi}_A$, and the maximum feasible subsidy in the case of "default" $\bar{\phi}_D$, it is also clear that the urban single-period preference is for default which, as per the discussion above, maximizes available (short-term) government resources and thereby allows for a higher level of food subsidies.[74] Thus, I define the urban ideal food

[72] Elections in Egypt are only the most recent example of this uncertainty by domestic groups (even by political actors) as to the viability of different political positions in newly democratized elections; see, for example, recent coverage in the New York Times, such as the story at http://www.nytimes.com/2012/05/20/world/middleeast/in-egypts-election-dark-horse-candidates-add-to-suspense.html.

[73] Observe that, while the expression for urban utility does change whether $y_U \lessgtr 1$, this change is not discontinuous at the threshold of $y_U = 1$, and thus preserves as well the monotonicity of $v_U(\phi)$.

[74] Note that this would be violated in cases where starving urban citizens had high enough discount rates to prefer the greater long-term resources available from faithful debt repayment as opposed to the short-term gains from default; however, as I suspect that concern about having enough to eat today tends to lead one to discount the future quite heavily, I am willing to ignore such cases.

policy in the case of democratization as

$$\phi^*_{U,democ} = \bar{\phi}_D \tag{28}$$

Rural citizens, on the other hand, will usually prefer lower food subsidies, as their income is tied directly to the price of food. However, when market prices become too unfavorable, rural producers sell nothing to the market, and instead simply consume the food that they have produced. More formally, note that when $y_R \geq 1 \Leftrightarrow \bar{b} \geq 1/(\pi - \phi)$, rural utility is decreasing monotonically in ϕ.[75] However, when $\bar{b} < 1/(\pi - \phi)$, rural utility reduces simply to

$$ln(\frac{y_R}{\pi - \phi}) \Leftrightarrow ln(\frac{(\pi - \phi)\bar{b}}{\pi - \phi}) \Leftrightarrow ln(\bar{b}) \tag{29}$$

which is clearly independent of ϕ. Thus, for such "subsistence" farmers, a marginal decrease in ϕ which does not raise $\bar{b}$ at least to equality with $1/(\pi - \phi)$ does not improve their utility at all. Intuitively, one may think of a situation in which, due to low agricultural prices, farmers have found it preferable to simply consume their own crops, rather than trying to market their crops and purchase goods. In such a situation, a marginal increase in food prices which does not at least cross the threshold of making market participation appealing for rural groups has, in effect, no impact on their wellbeing. That being the case, calling the value of food subsidies at which point farmers are exactly indifferent between entering the market and not $\tilde{\phi}_R$, it is clear that rural actors would prefer $\tilde{\phi}_R$ to any $\phi > \tilde{\phi}_R$, and so as long as there exists some $\tilde{\phi}_R$ where entering the market is preferred, then rural actors will generally prefer to set the lowest allowable food subsidy. Note that the boundary condition on this occurs when $\bar{b} \geq 1/\pi$; that is, whenever $\bar{b}$ is at least as large as $1/\pi$, then rural actors will prefer in democracy to set a food subsidy of zero. However, when $\bar{b} < 1/\pi$, market participation is not appealing to farmers even in the case of no food subsidies; in such a

[75] That is, $\partial v_R(.)/\partial\phi < 0$ whenever $\bar{b} \geq 1/(\pi - \phi)$.

world, farmers are effectively indifferent to the level of food subsidies, and in such cases, I assume that urban ideal policy is the equilibrium outcome of democratic elections.

Having described citizen ideal policies, I conclude my discussion of the expected outcome of democratization by defining the means by which actors form rational expectations about the likely outcome of democratic elections. As was noted above, new elections in freshly democratized countries are often subject to non-trivial amounts of uncertainty; without long-established party identities and well-defined candidate and citizen preferences, it may be difficult to determine what will be the result of electoral competition.[76] Thus, I employ a simplistic approach whereby each citizen assumes that her ideal policy will be selected in democracy in proportion to the share of total population which shares her preferences. That is, the expected food policy in a newly democratized country is given by

$$\phi^*_{democ} = \alpha\phi^*_{U,democ} + (1-\alpha)\phi^*_{R,democ} \tag{30}$$

which, taking values from the discussion of ideal citizen policies above, can be rewritten as

$$\phi^*_{democ} = \begin{cases} \alpha\bar{\phi}_D & \text{if } \bar{b} \geq \frac{1}{\pi} \\ \bar{\phi}_D & \text{otherwise} \end{cases} \tag{31}$$

[76]See, for example, the discussion in Cox (1997) of the fact that new democracies may take some time to arrive at the "rational" number of effective political parties, in part at least because of imperfect information both in terms of polls on citizen preferences as well as in terms of signaling capacity of party "brands." Note, however, that for the reader dissatisfied with this assumption, a more standard median voter model would look qualitatively similar to the one I use, save for the fact that equilibrium outcomes would shift dramatically at the point when urban citizens go from being 49.9% of the electorate to 51.1% instead. As I prefer to derive comparative statics on the urbanization rate, rather than following this "dichotomized" strategy, I stick to the current formulation.