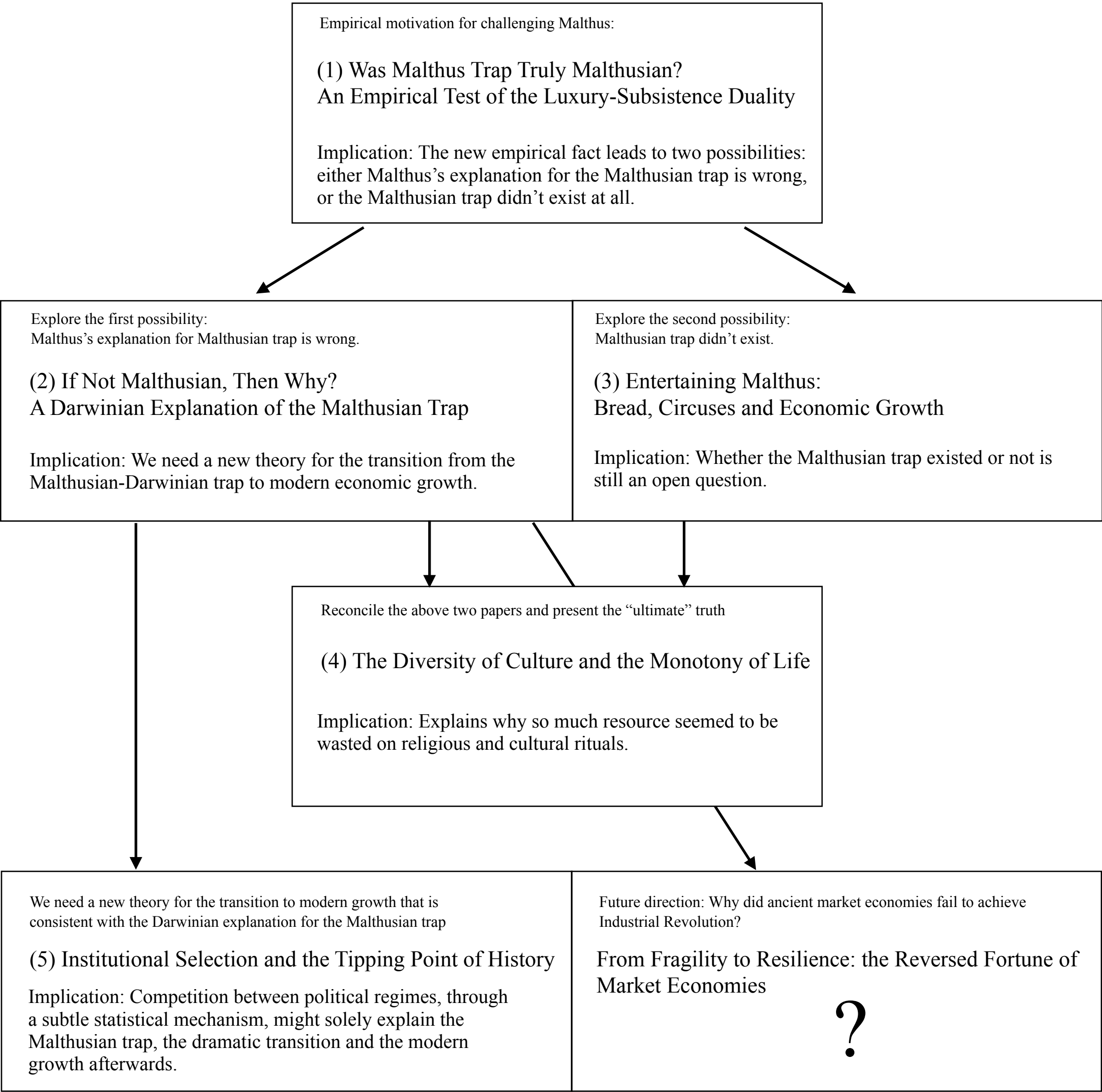


# A roadmap: my research on Very Long Run Growth

- Why were Ancient Rome and Song China so rich, not only on the aggregate level, but also in terms of per capita income?
- Why were early farmers worse off than their hunter-gatherer ancestors in living standards?
- Why did so many ancient thinkers advocate the suppression of commerce?
- What governs the evolution of living standards in the ancient world?
- Did Malthus truly explain the Malthusian trap?
- If not Malthusian, what is the ultimate reason?
- If Malthusian trap isn't Malthusian in nature, shouldn't we rethink how we escaped the so-called Malthusian trap?
- Is there a new theory for the Industrial Revolution that is consistent with the new explanation of the Malthusian trap?

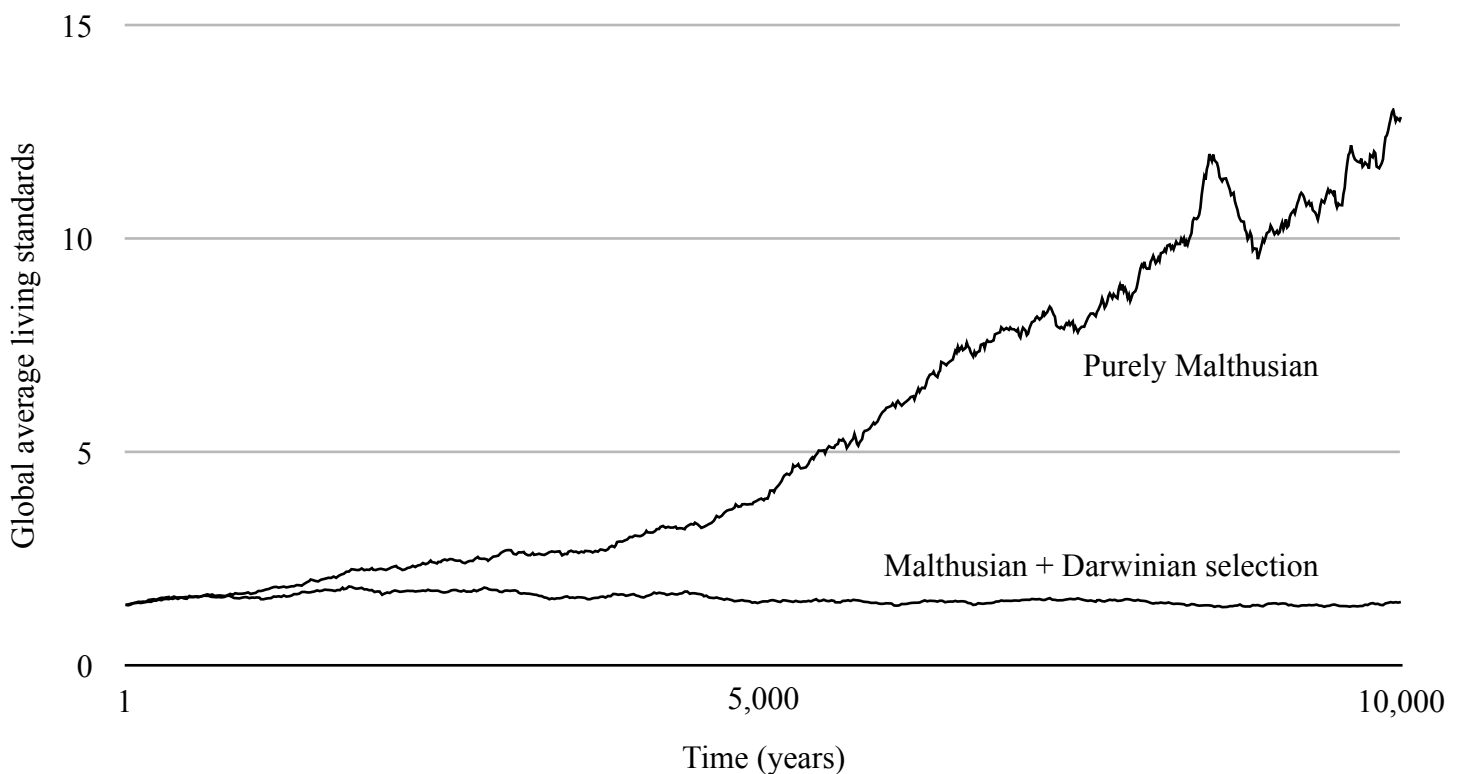


# Research Statement

## If Not Malthusian, Then Why? — Job Market Paper

This paper shows that the Malthusian mechanism alone cannot explain the pre-industrial stagnation of living standards. Improvement in luxury technology, if faster than improvement in subsistence technology, would have kept living standards growing. The Malthusian trap is essentially a puzzle of balanced growth between the luxury sector and the subsistence sector. The author argues that balanced growth is caused by group selection in the form of biased migration. It is proven that a tiny bit of bias in migration can suppress a strong growth tendency. The theory re-explains the Malthusian trap and the prosperity of ancient market economies such as Rome and Song. It also suggests a new set of factors triggering modern economic growth.

**Under unbalanced growth, living standards would have an upward trend unless group selection is introduced.**



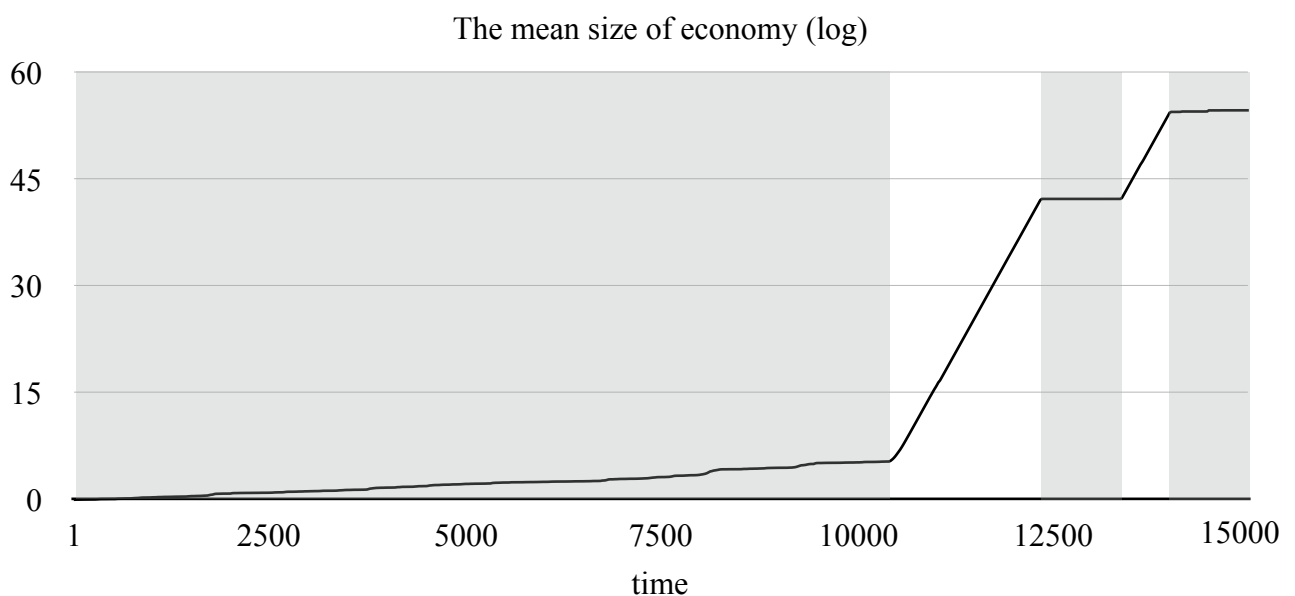
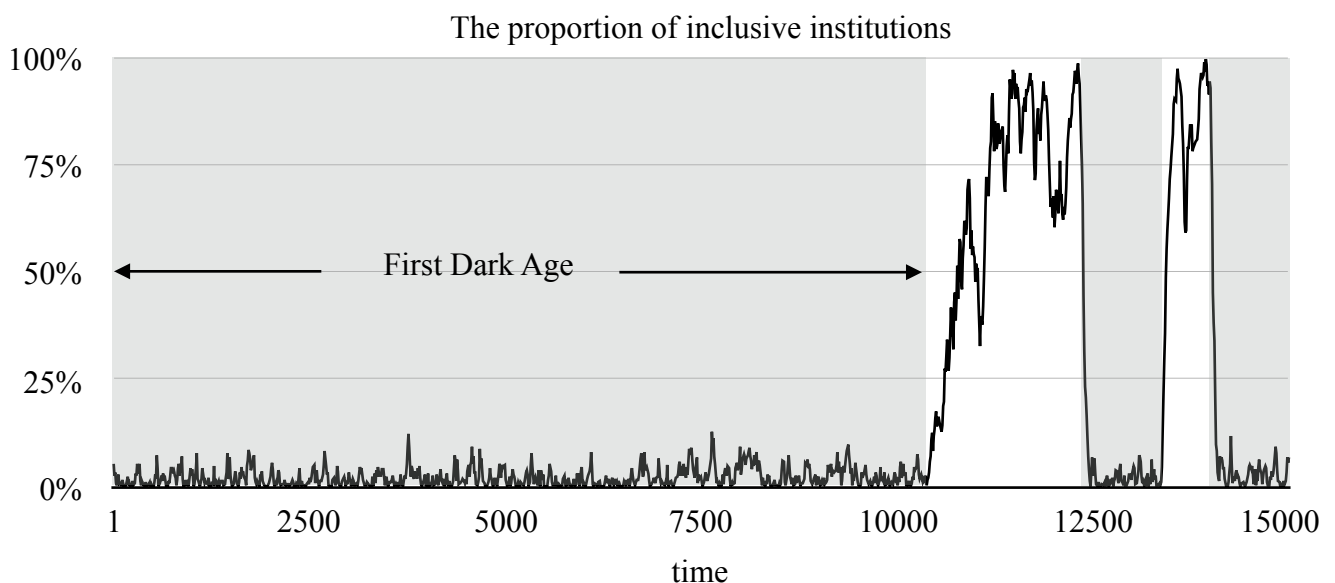
## The Diversity of Culture and the Monotony of Life

Using a luxury-and-subsistence two-sector framework, Wu (2015) provides a Darwinian explanation of the Malthusian trap. Long-term living standards solely depend on the ratio of luxury to subsistence. Malthusian trap arises because rich societies are subject to conquest and migration that tend to replace more luxurious cultures and technologies with less luxurious ones. However, the theory leaves one issue unresolved. If selection had been so powerful, why were there so many wasteful religious rituals and local customs in almost every ancient society despite deprivation of basic living supplies? To reconcile the diversity of culture and the monotony of life, this paper develops a three-sector model of economic growth. It is noted that many luxuries are culture-specific. They are desired within a culture but not without. Darwinian selection of culture and technology has no way to eliminate the growth of such luxuries because migration never responds to the difference of consumption in these items. A distinction is thus made between “universal luxury” and “provincial luxury”. Universal luxuries are desired by all human beings; provincial luxuries, only by a group of people. Selection suppresses universal luxuries, but leaves provincial luxuries free to grow. This explains why culture was so diverse across pre-industrial societies despite the Malthusian monotony of life, which is measured by universal luxury.

## Institutional Selection and the Tipping Point of History

Good institutions spur economic growth. Economic growth spreads good institutions. Obvious as it sounds, the two-way feedback between growth and institution did not seem to work until about 1500, by which time most of the earth had been dominated by bad institutions that brought about little economic growth. We observe that, before 1500, the Darwinian selection across political regimes were more in favour of growth-killing institutions, but after 1500, it favoured growth-friendly institutions instead. We explain the reversal by studying a special group of institutions. They have a positive effect on the growth rate but meanwhile a negative effect on the level of a regime's fitness. Contrary to conventional wisdom, if regimes compete intensely enough, then the level effect can dominate the growth effect for an extremely long time: a growth-friendly institution has to endure lasting suppression before its proportion among the regimes suddenly explodes. The theory explains why the global transition to modern economic growth came so late but progressed so fast once it was on track.

**Striking patterns emerge from a simple selection process that involves level-growth tradeoff.**



## The Economics of Etiquette Law: Sustaining Political Order by Mandatory Respect

Formal etiquette is an integral part of hierarchical rule, whether in government, elite schools or prisons. This paper explores the role of etiquette using a game-theoretic model and applies it to Confucian China. Confucianists hold that so long as a king implements etiquette properly, the country will enjoy lasting peace. But they never convincingly explain how etiquette contributes to the maintenance of political order. This paper interprets the rule of etiquette as the enforcement of mandatory respect. The incumbent is committed to punishing those who fail to respect him in stipulated ways. In a setting where the incumbent's strength is private information, the usurpers need to test the incumbent's type by showing disrespect and observing reactions. Etiquette commits the incumbent to harsh reactions irrespective of his strength, thus making his type untestable and saving him from being tested at all. The theory explains why the rule of etiquette is trivial in content, ubiquitous in coverage and harsh in enforcement. It also explains important features of Confucian cultures such as the emphasis on education. An extension of the model further explains why Europe did not achieve the same extent of rule of etiquette as many parts of Asia.

## Free Voice as a Bayesian Equilibrium: A Study of the Remonstrance System in Ancient Chinese Court

This paper frames the lack of voice in a hierarchical organization as a double informational asymmetry problem: the leader is unsure whether the subordinates are loyal; the subordinates are unsure whether the leader is strong. Suspicious that a criticizer might intend to test his type by voicing discontent and checking his response, a leader who confronts criticism often punishes the criticizer to signal that he is strong. But by doing so, the leader fails to benefit from those who intend to help him correct mistakes rather than undermine his authority. Is it possible to achieve free voice and stable political order at the same time? We show that the combination of free voice, credible tolerance and uncompromised authority can be held as a Bayesian equilibrium under proper institutional designs. We use the theory to explain features of the remonstrance system of ancient Chinese courts.

## Counterfeiter Paradox: Who Defended Monetary Stability in the Ancient World?

Despite the lack of adequate accountability of the government, most ancient autocracies maintain a level of monetary stability that rivals modern democracies. This paper hypothesises that it is the threat of counterfeit that has constrained currency debasement. Unwilling to share seigniorage with counterfeiters who are active only if currency is debased, the government refrains from debasement unless in extreme fiscal situation. To test the theory, we exploit the introduction of steam press in late Qing China as a natural experiment. Coins made by steam press machines have fine patterns that counterfeiters are unable to mimic. As the theory predicts, after steam press was introduced, the removal of counterfeiters' threat triggered the most serious debasement and inflation in Qing's history.

## Loyalty and Durability: Evidence from the Opening of Toothpaste Tubes

This article shows that durable producers under monopolistic competition tend to overextend durability to sell more service at a time. The distortion arises because customers are not committed to the same brand for the next purchase. A testable hypothesis is that firms with larger market shares should choose shorter durability. We test the hypothesis with data from the Chinese toothpaste industry, treating toothpaste as a durable good that provides service flow. As the theory predicts, firms with a larger market share choose a larger opening size for the toothpaste tubes they produce.