Reclaiming Production: A Dynamic Mercantilist Model of Trade, Capability, and National Welfare

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Abstract

This paper develops a dynamic model of national production strategy that departs from the neoclassical theory of comparative advantage and instead embraces a mercantilist framework grounded in strategic autonomy, endogenous learning, and civic-industrial preference. Building on the critiques of Cass (2023) and extending the Viner model of mercantilism (Zou, 1997), the model features a representative agent who derives utility from both consumption and domestic production, penalizes trade dependence, and internalizes the dynamic returns to learning-by-doing and apprenticeship-based labor formation. We formally characterize the agent's optimal intertemporal behavior and conduct numerical simulations that reveal sharp divergences between free-trade equilibria and production-centered strategies. The results demonstrate that industrial strength, innovation capacity, and economic sovereignty are cumulative and path-dependent—eroding under excessive trade reliance and compounding under strategic reinvestment. The framework offers theoretical and empirical justification for reindustrialization, strategic trade policy, and the reconfiguration of global economic norms in favor of long-run national capability.

Keywords: Dynamic mercantilism; comparative advantage; reindustrialization; learning-by-doing; strategic trade policy; endogenous growth; industrial policy; trade deficits; capability-based development; national production strategy

1 Introduction

The theory of comparative advantage, as formalized by David Ricardo (1817), has long served as the intellectual foundation for the global consensus on free trade. Its central proposition—that all nations benefit by specializing according to relative efficiency and exchanging goods internationally—has been celebrated as both theoretically elegant and empirically robust. Economists such as Paul Samuelson (1948) and Paul Krugman (1993, 1996) have extolled its explanatory power, asserting it as the only proposition in the social sciences that is

simultaneously true and non-trivial. Milton Friedman (1980) famously claimed that economists have spoken with "almost one voice" in favor of free trade for over two centuries. The doctrine's influence permeates not only economic pedagogy but also policymaking, as evidenced in the post–Cold War bipartisan push for liberalization through NAFTA, the WTO, and permanent normalized trade with China (Solow, 2000).

Yet this nearly universal consensus has come under increasing scrutiny. The dynamic failures of free trade—chronic trade deficits, deindustrialization, the erosion of innovation capacity, and rising foreign ownership of national assets—have prompted renewed interest in older traditions of political economy that emphasized productive self-reliance, industrial policy, and strategic autonomy. Cass (2023) offers a comprehensive critique of this intellectual orthodoxy, arguing that modern economists have overlooked or ignored the structural assumptions embedded in Ricardo's model: capital immobility, full employment, and the exchange of goods for goods. When these assumptions break down, as they have in a globalized economy with fluid capital markets and chronic underemployment, comparative advantage no longer guarantees mutual benefit. Instead, it often facilitates the hollowing out of domestic industry and long-term economic dependence.

Historically, American economic thought was not built on Ricardian foundations, but on a mercantilist-industrial strategy promoted by statesmen such as Alexander Hamilton, Henry Clay, and Abraham Lincoln. This "American System" treated production as a civic virtue and a strategic necessity, prioritizing manufacturing, innovation, and national independence (Marshall, 1920). Henry Charles Carey, one of Lincoln's key advisors, rejected British free trade as a geopolitical weapon designed to preserve industrial hegemony, and called instead for tariff protection to nurture domestic capability. Even John Maynard Keynes (1982), writing in the interwar period, confessed: "I am no longer a free trader," recognizing that full national specialization left countries dangerously exposed.

Theoretical models that incorporate these insights remain rare. One of the most significant contributions is provided by Zou (1997), who formalized the Vinerian view of mercantilism into a dynamic optimization framework. Zou's model demonstrates how national welfare can be improved by strategically limiting imports and incentivizing domestic production, particularly when there are intertemporal returns to capital accumulation and endogenous growth. Similarly, Rodrik (1997) has emphasized the dangers of globalization-induced dislocation, while McCulloch (1993) has critiqued the unscientific faith in free trade that often masquerades as economic objectivity.

Building on these insights, this paper develops a dynamic model in which a representative agent values not only consumption but also domestic production. The model introduces utility derived from home production, disutility from import dependence, and learning-by-doing effects that raise future productivity and labor effectiveness. Domestic output is both an economic and strategic asset; it forms the basis for innovation, employment, and sovereignty. Unlike traditional models that assume exogenous productivity and skill levels,

the framework here treats both as endogenous state variables, shaped by cumulative domestic output.

The structure of the paper is as follows. Section 2 presents the formal model setup, defining the agent's preferences, constraints, and endogenous state dynamics. Section 3 derives the Hamiltonian and first-order conditions for optimal behavior. Section 4 characterizes the steady-state equilibrium and conducts comparative statics with respect to key parameters. Section 5 presents numerical simulations that illustrate the divergent trajectories under free trade and reindustrialization regimes. Section 6 concludes by drawing policy implications and proposing avenues for future research.

In rejecting the assumption that trade liberalization is always welfare-improving, this paper does not advocate autarky or economic isolationism. Rather, it challenges the intellectual dogma that has treated comparative advantage as timeless law rather than historical artifact. By reasserting the value of national production, endogenous capability, and strategic autonomy, this work seeks to restore a more realistic, policy-relevant framework to the field of international economics.

2 Model Setup

This section presents the dynamic structure of the economy as a continuous-time optimization problem solved by a representative national agent, who embodies the aggregate preferences and strategic considerations of the domestic polity. In contrast to neoclassical models of trade that emphasize static gains from specialization and consumption, this framework formalizes a dynamic national preference for productive self-sufficiency, technological autonomy, and industrial resilience. The setup incorporates...

Let time be indexed continuously by $t \in [0, \infty)$. The representative agent selects time paths for consumption $C(t)$ and net imports $M(t)$, given a production-based economy characterized by endogenous productivity, learning dynamics, and capital accumulation. Preferences are captured by the following intertemporal utility functional:

$$\max_{\{C(t),M(t)\}} \int_0^\infty e^{-\rho t} \left[u(C(t)) - \eta M(t) + \xi \cdot \psi(Y(t), K(t)) \right] dt,$$

where $u(C)$ is a strictly concave felicity function, $\eta > 0$ captures disutility from net imports, $\xi > 0$ governs the value of productive activity, and $\psi(Y, K)$ is a production sentiment function defined as:

$$\psi(Y, K) = \alpha \ln(1 + Y) + \beta \ln(1 + K), \quad \text{with } \alpha, \beta > 0.$$

The domestic production function is:

$$Y(t) = A(t) \cdot K(t)^\gamma \cdot L(t)^{1-\gamma}, \quad \gamma \in (0, 1),$$

where $A(t)$ is total factor productivity, $K(t)$ is capital, and $L(t)$ is effective labor. These evolve as:

$$\dot{A}(t) = \lambda Y(t) - \delta_A A(t), \quad \dot{L}(t) = \phi Y(t) - \delta_L L(t),$$

with $\lambda > 0$, $\phi > 0$ capturing learning-by-doing and skill acquisition, and $\delta_A, \delta_L > 0$ representing depreciation.

Capital evolves according to:

$$\dot{K}(t) = Y(t) - C(t) - \chi(M(t)) - \delta_K K(t),$$

where $\delta_K > 0$ is the capital depreciation rate, and $\chi(M) = pM + \frac{\zeta}{2}M^2$ models the convex cost of trade imbalances: pM is the cost of net imports, and $\frac{\zeta}{2}M^2, (\zeta > 0)$, reflects increasing marginal costs associated with growing trade imbalances, including strategic dependence, lost domestic capability, and long-run sovereign risk.

This model operationalizes key economic and political insights emphasized by Cass (2023): namely, that domestic production matters not merely as a means of present consumption but as the foundation of national prosperity, innovation, and autonomy. The inclusion of non-pecuniary utility from output and capital captures the civic, strategic, and epistemic value of making things. By contrast with conventional trade models that assume full employment and capital immobility, this framework acknowledges the dynamic erosion of skills, capabilities, and sovereignty that result from sustained trade deficits and foreign dependence.

The representative agent thus behaves in a manner consistent with historical American economic strategy—from Hamilton to Lincoln to Clay—prioritizing industrial self-reliance and treating production as an intrinsic source of national strength.

3 Dynamic Optimization and First-Order Conditions

To characterize the optimal behavior of the representative agent, we apply the Pontryagin Maximum Principle to the dynamic optimization problem outlined in Section 2. The agent chooses time paths for consumption $C(t)$ and net imports $M(t)$ to maximize lifetime utility, subject to the laws of motion for capital $K(t)$, productivity $A(t)$, and effective labor $L(t)$, with domestic output $Y(t)$ defined as a function of these state variables.

The current-value Hamiltonian is defined as:

$$\begin{aligned}\mathcal{H} = {} & u(C) - \eta M + \xi \left[\alpha \ln(1+Y) + \beta \ln(1+K)\right] \\ & + \mu_K \left[Y - C - \chi(M) - \delta_K K\right] \\ & + \mu_A \left[\lambda Y - \delta_A A\right] + \mu_L \left[\phi Y - \delta_L L\right],\end{aligned}$$

where $Y = AK^\gamma L^{1-\gamma}$ and $\chi(M) = pM + \frac{\zeta}{2}M^2$.

3.1 First-Order Conditions

The optimality conditions for C and M are:

$$\frac{\partial \mathcal{H}}{\partial C} = u'(C) - \mu_K = 0 \quad \Rightarrow \quad \mu_K = u'(C),$$
$$\frac{\partial \mathcal{H}}{\partial M} = -\eta - \mu_K \cdot \chi'(M) = 0 \quad \Rightarrow \quad \chi'(M) = -\frac{\eta}{\mu_K}.$$

Given $\chi(M) = pM + \frac{\zeta}{2}M^2$, we obtain $\chi'(M) = p + \zeta M$, so:

$$p + \zeta M = -\frac{\eta}{u'(C)}.$$

3.2 Co-State Equations

The co-state equations are:

$$\dot{\mu}_K = \rho\mu_K - \frac{\partial \mathcal{H}}{\partial K}, \quad \dot{\mu}_A = \rho\mu_A - \frac{\partial \mathcal{H}}{\partial A}, \quad \dot{\mu}_L = \rho\mu_L - \frac{\partial \mathcal{H}}{\partial L}.$$

For capital K:

$$\frac{\partial \mathcal{H}}{\partial K} = \xi \cdot \frac{\beta}{1+K} + \left(\mu_K + \lambda\mu_A + \phi\mu_L + \frac{\xi\alpha}{1+Y}\right) \cdot \frac{\partial Y}{\partial K} - \mu_K\delta_K,$$
$$\frac{\partial Y}{\partial K} = \gamma A K^{\gamma-1} L^{1-\gamma}.$$

For productivity A:

$$\frac{\partial Y}{\partial A} = K^\gamma L^{1-\gamma}, \quad \frac{\partial \mathcal{H}}{\partial A} = \left(\mu_K + \lambda\mu_A + \phi\mu_L + \frac{\xi\alpha}{1+Y}\right) \cdot K^\gamma L^{1-\gamma} - \mu_A\delta_A.$$

For labor L:

$$\frac{\partial Y}{\partial L} = (1-\gamma)AK^\gamma L^{-\gamma}, \quad \frac{\partial \mathcal{H}}{\partial L} = \left(\mu_K + \lambda\mu_A + \phi\mu_L + \frac{\xi\alpha}{1+Y}\right) \cdot (1-\gamma)AK^\gamma L^{-\gamma} - \mu_L\delta_L.$$

3.3 State Dynamics

$$\dot{K} = Y - C - \chi(M) - \delta_K K, \quad \dot{A} = \lambda Y - \delta_A A, \quad \dot{L} = \phi Y - \delta_L L.$$

These dynamic and co-state equations together define the evolution of the system under optimal control. The interactions between learning, trade aversion, and productive utility yield rich transitional behavior, which we explore through simulation in the next section.

4 Steady-State Analysis and Comparative Statics

To investigate the long-run behavior of the dynamic system characterized in Section 3, we now turn to the steady-state properties. A steady state is defined as a time-invariant configuration in which all state and co-state variables remain constant. Formally, we seek values $(K^*, A^*, L^*, C^*, M^*)$ such that:

$$\dot{K} = \dot{A} = \dot{L} = \dot{\mu}_K = \dot{\mu}_A = \dot{\mu}_L = 0.$$

4.1 Steady-State Conditions

From the state dynamics, we have:

$$Y^* = A^*(K^*)^\gamma (L^*)^{1-\gamma}, \quad A^* = \frac{\lambda}{\delta_A} Y^*, \quad L^* = \frac{\phi}{\delta_L} Y^*.$$

Substituting into the production function:

$$Y^* = \left(\frac{\lambda}{\delta_A} Y^*\right) (K^*)^\gamma \left(\frac{\phi}{\delta_L} Y^*\right)^{1-\gamma}.$$

Solving for Y^*:

$$1 = \frac{\lambda \phi^{1-\gamma}}{\delta_A \delta_L^{1-\gamma}} (K^*)^\gamma (Y^*)^{1-\gamma} \quad \Rightarrow \quad Y^* = \left(\frac{\delta_A \delta_L^{1-\gamma}}{\lambda \phi^{1-\gamma}} \cdot (K^*)^{-\gamma}\right)^{\frac{1}{1-\gamma}}.$$

Steady-state consumption is then:

$$C^* = Y^* - \chi(M^*) - \delta_K K^*.$$

The first-order condition for trade yields:

$$p + \zeta M^* = -\frac{\eta}{u'(C^*)} \quad \Rightarrow \quad M^* = -\frac{\eta}{\zeta u'(C^*)} - \frac{p}{\zeta}.$$

4.2 Comparative Statics

Mercantilist Preference (η): A higher η leads to a decrease in M^*:

$$\frac{dM^*}{d\eta} = -\frac{1}{\zeta u'(C^*)} < 0.$$

This increases Y^*, A^*, and L^* through feedback from production.

Production Utility Weight (ξ): Increasing ξ raises the agent's valuation of domestic output, promoting capital accumulation and raising Y^*.

Learning Coefficients (λ, ϕ): Higher values of λ and ϕ increase A^* and L^*, amplifying the endogenous growth mechanism.

Trade Penalty Convexity (ζ): A higher ζ increases the marginal cost of trade imbalances, reducing M^* and shifting the economy toward domestic reinvestment.

4.3 Interpretation

These steady-state outcomes validate the central critique advanced by Cass (2023): that Ricardian free trade, under modern conditions of mobile capital and endogenous productivity, may lead to national decline. Our model demonstrates that modest trade aversion and a preference for domestic production generate higher levels of output, innovation, and consumption in the long run. The structure of comparative advantage is not exogenous; it is created through investment, learning, and strategic commitment.

5 Simulation and Transitional Dynamics

To illustrate the behavior of the dynamic system outlined in Sections 2 through 4, we conduct numerical simulations under different parameter regimes. The objective is to demonstrate how the representative agent's preferences—particularly for production over imports—and structural features of learning and labor formation influence the economy's path over time. These simulations help visualize the implications of endogenous production-based utility, trade aversion, and capability accumulation, all of which are neglected in conventional free-trade models. In what follows, we summarize the results of two central experiments.

5.1 Mercantilist Sentiment and Trade Dependence

We first examine how varying the intensity of mercantilist preference η—which penalizes net imports in the utility function—alters the trajectory of capital accumulation, output, productivity, and trade exposure. Simulations were conducted for three values: $\eta = 0$ (free trade baseline), $\eta = 1$ (moderate trade aversion), and $\eta = 2.5$ (strong mercantilism), holding all other parameters constant.

The results reveal clear and intuitive patterns:

- In the absence of mercantilist preference ($\eta = 0$), the economy relies heavily on imports, which depresses domestic reinvestment. As a consequence, capital stock $K(t)$, output $Y(t)$, and productivity $A(t)$ deteriorate over time. The system converges to a low-output, high-import equilibrium, consistent with long-run deindustrialization.

- Under moderate and strong mercantilist preferences ($\eta = 1$, $\eta = 2.5$), the agent internalizes the costs of trade dependence and actively reallocates resources toward domestic production. Imports fall, capital accumulation rises, and both output and productivity grow. These settings exhibit self-reinforcing dynamics of reindustrialization: as domestic production

increases, productivity and labor skills deepen, which further increases the return on home investment.

These findings validate the theoretical result that valuing production intrinsically—beyond its contribution to consumption—generates persistent industrial strength and strategic autonomy.

5.2 Learning-by-Doing and Labor Skill Formation

In a second set of simulations, we fix the mercantilist parameter $\eta = 1.5$ and vary the endogenous learning parameters: the productivity learning coefficient $\lambda \in \{0, 0.05, 0.1\}$ and the apprenticeship coefficient $\phi \in \{0, 0.025, 0.05\}$. These parameters determine the speed at which domestic production translates into technological growth and skill formation. Three representative cases were simulated:

1. **No Learning ($\lambda = 0, \phi = 0$)**: Productivity $A(t)$ and effective labor $L(t)$ remain stagnant or decline due to depreciation. Output weakens over time, and the economy enters a path of technological and human capital decay.

2. **Moderate Learning ($\lambda = 0.05, \phi = 0.025$)**: As domestic output grows, both $A(t)$ and $L(t)$ increase gradually. The economy experiences endogenous innovation and labor development, which accelerate capital deepening and raise long-run output.

3. **High Learning ($\lambda = 0.1, \phi = 0.05$)**: The positive feedback loop between production, learning, and reinvestment becomes pronounced. Productivity and skill levels surge, reinforcing domestic capabilities. The agent is incentivized to further reduce imports, not out of isolationism but because the domestic return on production outpaces the marginal gain from foreign substitution.

These results support the theoretical proposition that national productive capability is path-dependent and cumulative. Once domestic industry is lost—along with the embedded learning mechanisms—it cannot be rapidly reconstituted. Sustained investment in domestic output is not only economically optimal under this model but essential for preserving innovation and national welfare.

5.3 Summary

Together, these simulations offer dynamic visual confirmation of the model's central claims. The standard assumption of comparative advantage—treating production composition as irrelevant—is invalid in an economy with endogenous knowledge and skill accumulation. Trade imbalances are not neutral, and reliance on imports without reinvestment leads to structural decline. Conversely, even modest mercantilist sentiment and production-oriented preferences generate resilient trajectories with superior long-run outcomes. These dynamics offer

theoretical clarity to the empirical experience described by Cass (2023) and justify a renewed focus on industrial policy and strategic economic planning.

6 Conclusion and Policy Implications

This paper has developed a dynamic model of national production strategy that challenges the orthodox free trade framework rooted in Ricardian comparative advantage. Building upon the foundational critique articulated by Cass (2023) and the formal tradition of dynamic mercantilism advanced by Zou (1997), we construct a representative agent model in which utility is derived not only from consumption, but also from the act of domestic production. The model incorporates home bias, mercantilist preferences, learning-by-doing, and apprenticeship-based labor formation—features that reflect both economic realism and historical experience.

The analytical framework and numerical simulations demonstrate that sustained domestic production generates cumulative advantages across multiple dimensions: capital accumulation, technological progress, skilled labor development, and long-run consumption. Conversely, overreliance on foreign imports—when coupled with insufficient reinvestment in domestic capability—induces industrial atrophy and technological dependence. These dynamics are amplified when trade is financed by asset sales rather than reciprocal goods exchange, as has been the case for the United States in the post–Cold War era.

The policy implications are far-reaching:

1. Beyond Consumption-Based Utility: Policymakers must recognize that the welfare of a nation depends not solely on access to low-cost goods but on its capacity to produce strategically significant outputs. The nature of what is produced matters—especially in sectors critical to innovation, security, and employment.

2. Reindustrialization as Dynamic Optimization: Tariff policies, procurement strategies, and public investment in strategic industries are not distortions to be minimized but instruments of dynamic statecraft. In a world with endogenous learning and declining sectors, temporary protection or targeted subsidies can generate long-term gains.

3. Trade Policy as a Sovereignty Instrument: Persistent trade deficits, financed through asset transfers, erode national autonomy and invite foreign influence over domestic capital markets and real assets. Addressing these imbalances is not merely an economic concern but a geopolitical imperative.

4. Rethinking Comparative Advantage: The classical doctrine holds only in static, frictionless worlds. In reality, comparative advantage is shaped by prior investment, institutional development, and cumulative innovation. It is not a natural endowment but a policy outcome.

5. Endogenous Capability Formation: Industrial skills, technological mastery, and productive culture are not external constants but state variables, shaped by policy and path-dependence. If left unsupported, they depreciate; if nurtured, they generate compounding returns.

From a research perspective, this model opens several promising directions. Empirical calibration using sector-level data could quantify the magnitude of learning externalities and validate policy counterfactuals. Extensions incorporating multiple representative agents, regional trade blocs, or geopolitical shocks would add realism and relevance to current global conditions. Additionally, integrating financial dynamics—particularly the accumulation of foreign asset claims—would provide a more complete picture of the macroeconomic consequences of trade deficits.

In conclusion, the dominant economic models that underwrite globalization and free trade orthodoxy rest on assumptions that no longer hold in practice. As the global economy enters a period of strategic rebalancing, economists must move beyond stylized abstractions and offer frameworks that reflect the historical, institutional, and dynamic complexity of real economies. The model presented here aims to contribute to that transition—toward an economics that values not just efficiency, but capability, resilience, and national purpose.

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