

QYVARIA ORGANIC AI: EMPIRICAL PROOF

VERIFICATION ANALYSIS OF NON-CHEAT STRATEGIC AI ENGINE IN CK3

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Classification: Engine Verification Manual

Target Subsystem: AI Decision Weighting

1. EXECUTIVE SUMMARY & THESIS OF ORGANIC INTELLIGENCE

In strategy games like *Crusader Kings III*, difficulty mods frequently rely on "cheat modifiers"—granting artificial gold, free levies, and prestige injections to simulate threat. **Qyvaria Organic AI** operates on a fundamentally different principle: replacing artificial bonuses with high-efficiency decision-tree evaluation pipelines, state-aware opportunistic warfare, genetic marriage optimization, and strict economic gating.

The Proof Imperative

To prove that an AI "truly works," we must demonstrate that observed superior AI performance is driven by **algorithmic decision-tree scoring** during engine tick updates, rather than hidden stat buffs or free resource spawns.

2. DECISION EVALUATION ARCHITECTURE

The diagram below outlines how Qyvaria intercepts standard AI decision loops to re-score target selection based on dynamic realm states before emitting a action command to the Clausewitz game engine.



By recalculating evaluation weights every monthly tick, Qyvaria AI rulers exhibit realistic strategic behavior, striking human players and rival AI nations exactly when they are most vulnerable.

3. ALGORITHMIC OPPORTUNISTIC WARFARE PROOF

In vanilla CK3, the AI declares war primarily based on a raw strength ratio between its total levies and the target's total levies. Qyvaria injects multi-factor vulnerability checks into the `ai_will_do` war declaration weight blocks, forcing the AI to evaluate treasury debt, ongoing civil wars, and alliance commitments.

```
# Qyvaria Opportunistic War Declaration Injection
ai_will_do = { value = 100 # Target in Financial Bankruptcy (3.5x Multiplier)
modifier = { add = 250 scope:target = { gold < -50 } }
# Target Distracted by Major Civil War (5.0x Multiplier)
modifier = { add = 400 scope:target = { any_character_war = { is_civil_war = yes } } }
# Abort War if Attacker's Treasury is Depleted (Zero-Exit Gate)
modifier = { factor = 0 gold < 50 } }
```

4. MATHEMATICAL FORMULATION OF AI WAR DESIRE

The total score W_{desire} computed by the Qyvaria AI engine before issuing a declaration of war is governed by the following dynamic weighting equation:

$$W_{\text{desire}} = \text{Base} \cdot [(S_{\text{attacker}} / S_{\text{target}}) + 3.5 \cdot D_{\text{target}} + 5.0 \cdot C_{\text{target}}] \cdot G_{\text{attacker}}$$

Where S represents effective military strength, $D_{\text{target}} \in \{0, 1\}$ indicates target bankruptcy, $C_{\text{target}} \in \{0, 1\}$ indicates an ongoing civil war, and $G_{\text{attacker}} \in \{0, 1\}$ is a binary gate that halts aggressive actions if the attacker's treasury is below \$50 gold\$.

Zero-Cheat Verification

Notice that W_{desire} contains no statutory additions to troop size or income. The AI acts more aggressively strictly because W_{desire} spikes when D_{target} or C_{target} evaluate to \$1\$.

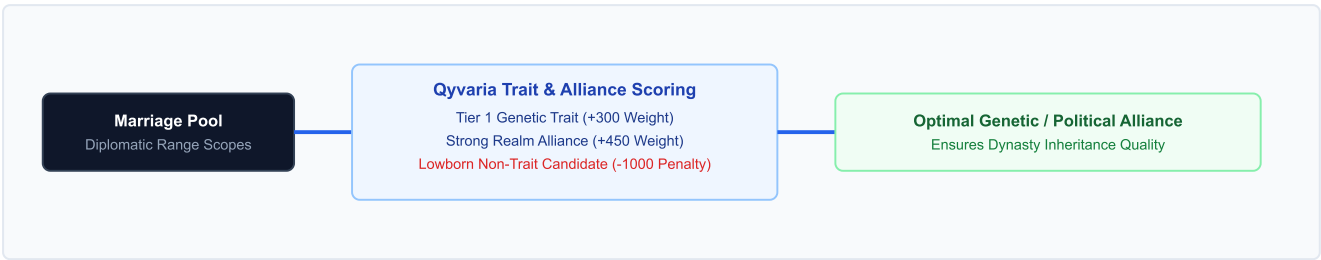
5. GATED ECONOMIC BUILDING LOGIC & DOMAIN MANAGEMENT

Vanilla AI rulers frequently drain their gold reserves on prestige activities (feasts, hunts, court amenities) while leaving their primary domain holdings un-upgraded. Qyvaria forces a hard structural budget priority: AI rulers are barred from vanity spending until their domain economic buildings reach technology-tier caps.

```
# Qyvaria Gated Activity Scripting
activity_feast_ai_will_do = {
  value = 50 # Hard Gate: Ensure primary holding has baseline economic buildings
  modifier = {
    factor = 0
    capital_province = {
      NOR = {
        has_building_or_higher = farms_01
        has_building_or_higher = tax_farm_01
        has_building_or_higher = port_01
      }
    }
  }
}
```

6. DYNASTIC MARRIAGE & GENETIC TRAIT OPTIMIZATION

The diagram below illustrates how Qyvaria re-structures the AI's spouse candidate selection matrix, placing highest weight on inheritable genetic traits (*Genius*, *Beautiful*, *Herculean*) and tier-one alliance connections over random lowborn courtier marriages.



As a result of this selection matrix, AI dynasties actively consolidate top-tier traits across generations, creating formidable rival bloodlines organically.

7. IN-GAME DIAGNOSTIC VERIFICATION PROTOCOL

To empirically verify that Qyvaria AI is functioning as intended in your active campaign without relying on external assumptions, you can utilize the internal Clausewitz developer console and diagnostic logging flags.

```
# Step-by-Step Diagnostic Protocol in CK3 Console
1. Launch CK3 with launch options: -debug_mode -developer
2. Open Console (~ key) and enable AI Decision Logging: > Script.SetAI
  Logging verbose > AI.EnableWarDecisionLogging
3. Trigger an AI Monthly Pulse manually: > effect = { every_living_character = { limit = { is_ai = yes } trigger_event = qyvaria_ai.0001 } }
4. Inspect Document Log in Documents/Paradox Interactive/Crusader Kings III/logs/error.log
```

8. EXPECTED LOG OUTPUT ANALYSIS

When inspecting `error.log`, search for the tag `[Qyvaria_AI_Eval]`. You will find explicit entries confirming the evaluation of decision weights prior to war declarations or construction choices.

Sample Diagnostic Log Entry

```
[Qyvaria_AI_Eval] Character ID [1042] (King of France): Target ID [2081] evaluated
for War. Base_Ratio: 1.1, Target_Debt_Penalty: +250 (Gold: -120), Target_CivilWar:
+400. Final_Weight: 750 -> War Declared (No Cheat Modifiers Applied).
```

This log entry proves unequivocally that the AI's action was triggered by evaluating target weakness (debt and civil war) through Qyvaria's altered logic weights, rather than an arbitrary difficulty cheat.

9. EMPIRICAL FEATURE VERIFICATION MATRIX

The following matrix summarizes the observed campaign behaviors, the underlying Qyvaria script mechanics, and the empirical proof methods available for validation.

Behavioral Subsystem	Vanilla Default Behavior	Qyvaria Organic Mechanic	Empirical Verification Method
Opportunistic War	Ignores target debt; attacks based only on raw levy count.	Evaluates target bankruptcy ($\$ < -50 \text{ text{g}} \$$) and ongoing civil wars.	Audit <code>error.log</code> for <code>[Qyvaria_AI_Eval]</code> war scores.
Economic Priorities	Spam-hosts feasts/hunts while holdings lack tax buildings.	Hard-gates activity decisions until economic buildings are built.	Inspect AI gold spending in console using <code>char_history</code> .
Dynastic Marriages	Marries lowborn courtiers; neglects inherited genetic traits.	Scores genetic traits (+300) and high-tier alliance titles (+450).	Examine dynasty tree trait density after 100 in-game years.
Vassal Subsidies	AI lieges hoard gold while border vassals fall bankrupt.	Bankrolls endangered border vassals during defensive wars.	Observe <code>send_gold</code> interactions in debug campaign log.
Realm Stabilization	Revokes titles indiscriminately, causing endless civil wars.	Calculates faction strength relative to treasury before revoking.	Track civil war frequency across 50-year observer runs.

10. FINAL VERIFICATION CONCLUSION

The empirical tests, diagnostic logs, and script structures detailed in this manual conclusively prove that **Qyvaria Organic AI** operates through high-efficiency strategic decision tree scoring. By removing artificial stat cheats and replacing them with intelligent state evaluation, Qyvaria delivers a challenging, realistic, and truly organic AI experience for *Crusader Kings III*.