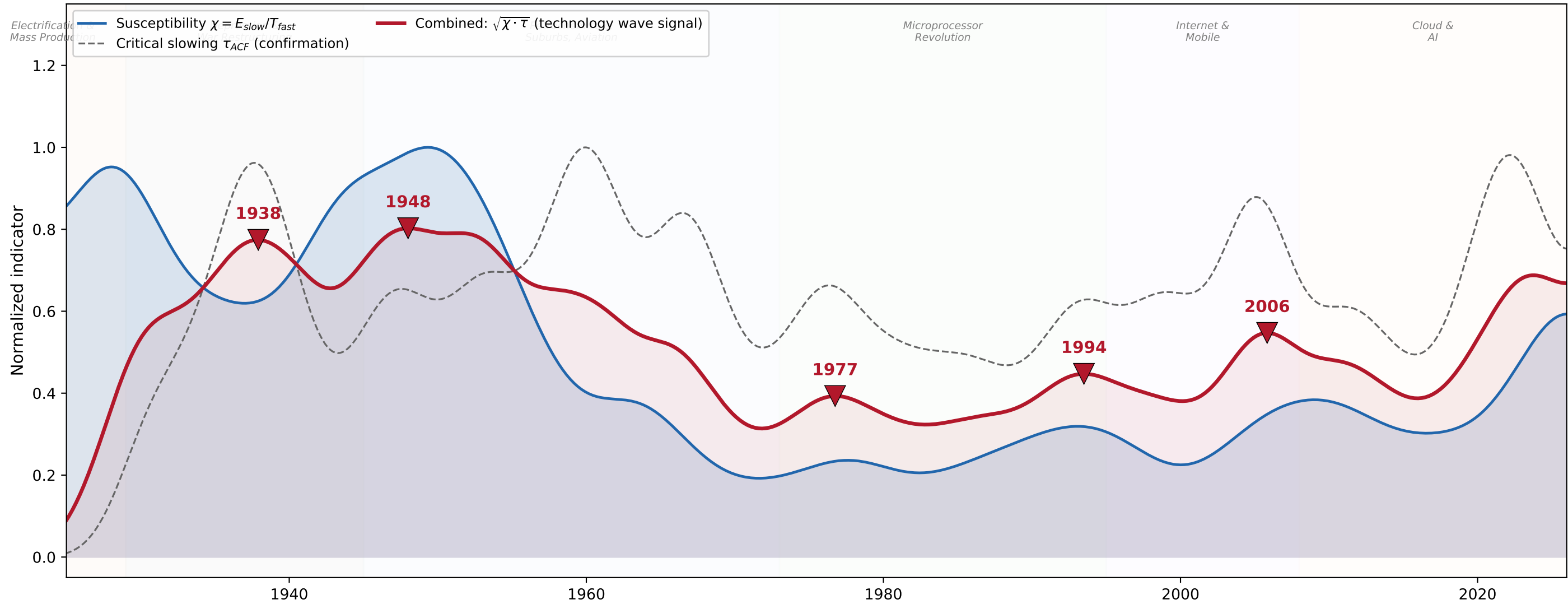
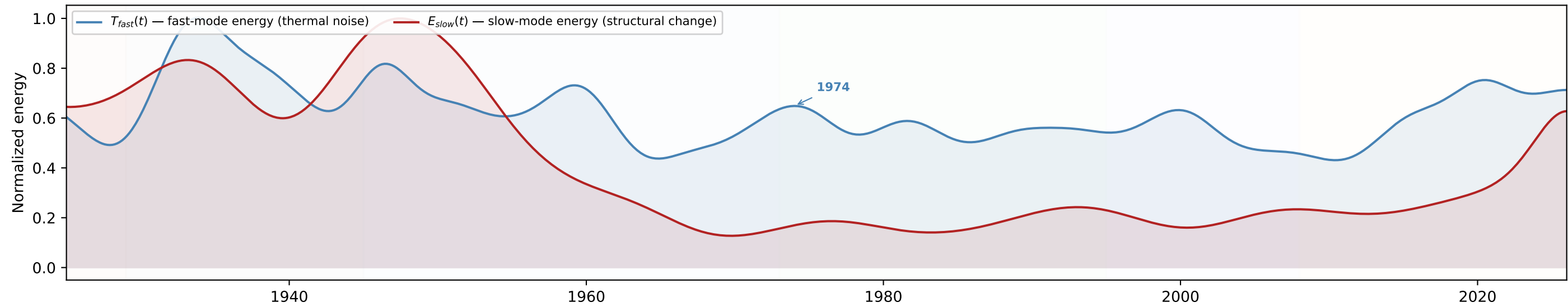


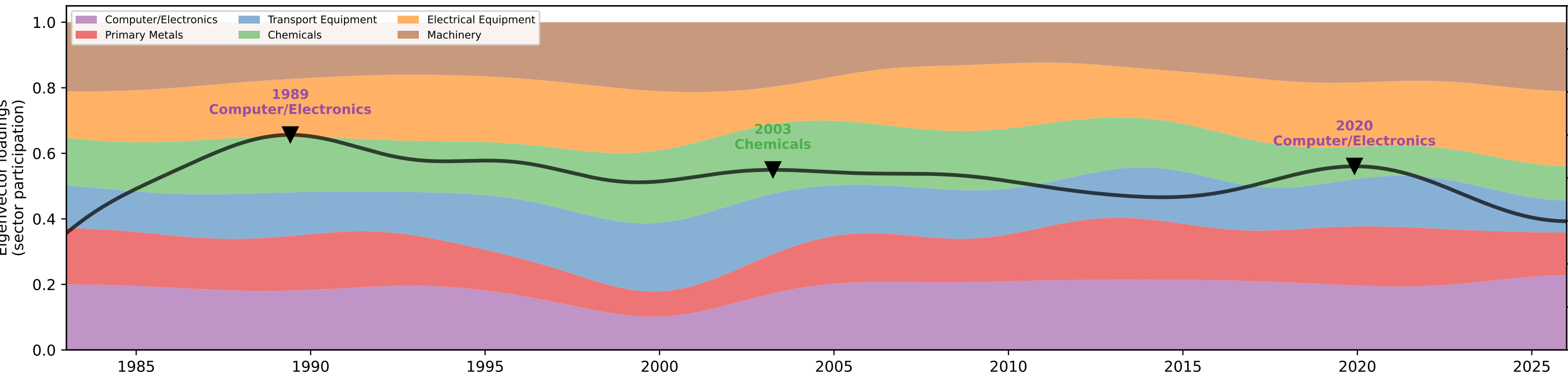
Technology Waves Discovered from Production Data Alone (INDPRO 1919-2025)  
Self-consistent  $T$  from fast EEMD modes — no VIX, no patents, no technology labels used



Why it works: crises spike  $T_{fast}$  (denominator), tech waves spike  $E_{slow}$  (numerator) — ratio discriminates automatically



Sector Fingerprints: eigenvector of slow-mode covariance identifies WHICH sectors drive each structural transition



VALIDATION: Peaks discovered by free-energy detector vs known technology eras

Detected	chi	tau	Combined	Nearest Known Era	Match
1938	0.62	0.96	0.774	Depression & War Restructuring	YES
1948	0.99	0.65	0.803	Petrochemicals, Suburbs, Aviation	YES
1977	0.23	0.66	0.393	Microprocessor Revolution	YES
1994	0.32	0.63	0.447	Microprocessor Revolution	YES
2006	0.35	0.86	0.547	Internet & Mobile	YES

Method: EEMD fast/slow partition -> sqrt(chi x tau ACF)  
Inputs: INDPRO monthly (1919-2025). No patents, no technology labels, no external temperature proxy.  $T$  derived self-consistently from fast-mode energy (statistical mechanics first principles).