

In-Class Assignment CB2: Programmability – 3 Uses, 3 Abuses

Context. “Programmable money” means CBDC units whose *use* can be conditioned on time, location, merchant category, identity, or any other on-chain predicate. China’s e-CNY has been piloted with expiry dates (“use or lose by Feb 28”); the ECB has explicitly rejected programmability for the digital euro, while maintaining *programmable payments* (atomic settlement) as a separate category. You are drafting a policy brief for Swiss FINMA on a hypothetical retail e-CHF.

Q1. List **3 pro-social programmability features** with a concrete use case and the expected welfare gain.

Solution. (1) **COVID-style fiscal transfer expiry:** €200 hardship payments with a 90-day expiry boost the marginal-propensity-to-consume from ~0.4 to ~0.9 (empirical evidence from China’s 2020 e-CNY pilots), giving 2–3× the fiscal multiplier for the same budget. (2) **Atomic DvP securities settlement:** wholesale CBDC + on-chain bond = instant T+0 settlement, eliminating the \$1.5T/day CCP margin float (BIS Project Helvetia II, 2022). (3) **Means-tested programme disbursement:** a child-care subsidy that is spendable only at licensed providers cuts fraud from ~3% to ~0.1% and eliminates paperwork reconciliation (welfare-state automation savings estimated at €2–5B/year for a medium EU state).

Q2. List **3 dystopian abuses** and the population each targets most.

Solution. (1) **Political expression chilling:** disabling a citizen’s CBDC after attending a banned protest (Canada 2022 truckers precedent applied to CBDC in real time, not via bank freeze orders). Target: dissenters. (2) **Social-credit conditioning:** CBDC denies purchases of meat/fuel/luxury above a carbon or behaviour quota (China 2014 Social Credit System draft contemplated this; e-CNY makes it one-line code). Target: all citizens, with disparate impact on poor and rural. (3) **Geographic confinement:** CBDC stops working outside a 50-km radius of registered address (Iran-style travel restrictions). Target: political prisoners, minority groups, refugees. Each of the 3 abuses has a historical precedent done via account freezes; CBDC makes them default, real-time, and untraceable.

Q3. Propose **one red-line policy** that preserves pro-social uses while blocking the dystopian ones. Defend in one line.

Solution. Red line: any CBDC balance must be convertible 1:1 into anonymous physical cash on demand, up to €3,000 per transaction. Rationale: this preserves (1) fiscal-transfer expiry (pro-social – the citizen can choose to withdraw as cash and spend later, just not keep it in CBDC form), (2) atomic settlement (pro-social – wholesale DvP is unaffected), (3) means-tested disbursement (pro-social – the state can still issue conditional balances, but citizens retain an exit), while blocking (1’) political chilling (cash is still usable), (2’) social-credit (convert and spend), (3’) geographic confinement (walk to ATM). Acceptable alternatives: (i) constitutional amendment that programmable conditions on individual CBDC are illegal unless approved by the individual (opt-in model); (ii) a “purpose limitation” statute forbidding any condition not attached at issuance; (iii) hard-coded protocol-level rule: no conditions may be added to CBDC after issuance.