

Computer problems 09

Task 1. There are four firms in a small open economy: two are exporters (Firm E1 and Firm E2) that produce goods for sale abroad, and two are importers (Firm I1 and Firm I2) that purchase goods abroad for sale in the domestic market. The firms' decisions regarding the volume of production and imports affect the supply and demand for currency, and therefore the exchange rate. The exchange rate, in turn, affects the firms' profits and the number of employees they hire. Your task is to simulate this system for 200 months and study the dynamics of the exchange rate and employment. Specify the production functions of all firms that depend on the number of employees hired. Introduce the demand function for goods in the domestic market. Given that prices abroad are constant in foreign currency, study the dynamics of exchange rate fluctuations in the country, and determine the unemployment rate in each period. Calculate the total government losses on unemployment benefits.

Task 2. Two countries, Country A and Country B, trade with each other. Country A produces and exports automobiles and textiles to Country B, and Country B produces and exports electronics and furniture to Country A. Each country has two firms: in Country A, Firm A1 (automobiles) and Firm A2 (textiles), and in Country B, Firm B1 (electronics) and Firm B2 (furniture). Initially, trade is unrestricted, but later the countries may impose tariffs on each other's imports. Model the dynamics of this market over 100 periods and investigate how tariff wars affect trade volumes, firm profits, and consumer welfare in each country. Consumer welfare in each country depends on the prices and availability of all four goods (both domestic and imported). Investigate the dynamics of the exchange rate.

Task 3. Two countries, Ecolandia and Technotronia, trade with each other. Ecolandia produces and exports organic products (fruits and wood) to Technotronia, and Technotronia produces and exports robots and software to Ecolandia. Each country has two firms: in Ecolandia, Firm E1 (fruits) and Firm E2 (wood), and in Technotronia, Firm T1 (robots) and Firm T2 (software). Initially, trade is unrestricted, but later countries may impose quotas on each other's imports. Model the dynamics of this market over 120 periods and investigate how the introduction of quotas affects trade, firm income, and employment in each country. The level of employment in each country depends on the output of local firms, which in turn depends on access to imported goods (for example, robots from Technotronia increase productivity in Ecolandia). Also investigate the impact on the price index in each country, given that commodity prices depend on import volumes and local production costs.