HOW OCCUPIED FRANCE FINANCED ITS OWN EXPLOITATION
IN WORLD WAR II

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How Occupied France Financed Its Own Exploitation in World War II

By Filippo Occhino, Kim Oosterlinck, and Eugene N. White[*]

Can a vanquished country deliver significant resources to its occupier? Based on the failure of Germany to pay its post-World War I reparations, conventional wisdom generally doubts the possibility. Yet, German reparations represent the exception rather than the rule. Perhaps, the most successful case was the transfer of resources that Germany obtained from France during World War II. Although they imposed huge payments, the victors left the French to decide how to raise the funds. After comparing the magnitude of France's payment to other episodes, we employ a neoclassical growth model to assess both wartime and postwar policies. The burden imposed on the French economy caused it to shrink at a rapid pace, curtailing consumption and yielding large debt and money overhangs. Although Vichy intended to manage the postwar debt burden with higher tax rates, the governments following Liberation allowed inflation to slash the debt, redistributing the adjustment cost. Higher taxes did not fund the debt but instead paid for expenditures associated with the rise of the welfare state.

I. Occupation Payments

During World War II, the French economy became a vital part of the German war machine.   Even though measures of GDP are fragile and underestimates because of the substantial black market (20 to 30% of GDP), the total occupation payments extracted by the Nazis is stunning, rising from 20 to 50% official GDP between 1940 and 1943 (Milward, 1970; Occhino, Oosterlinck and White, 2006). Their magnitude can be

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assessed by a comparison to other war reparations. Following both Napoleon's defeat in 1815 and the Franco-Prussian war in 1871, France paid 20 to 25% of GDP. If France had managed to wholly finance these burdens with foreign loans, thus minimizing the burden, the debt service would have approximated 1% of GDP. The postwar World War I German reparations represented 83% of GDP or a debt service of 2.5% of GDP. In contrast, Vichy France paid occupations expenses totaling 111% of prewar GDP. France did not have the option to borrow as foreign capital markets were closed; had France secured foreign loans, the debt service would have reached nearly 3% of GDP.

Occupation payments were conceded when Blitzkrieg against France ended with the armistice of June 22, 1940 and the installation of Marshal Philippe Pétain, as head of government. France lost territory to Germany, Italy and Belgium; the remainder was divided into the Occupied Zone, under German control, and the Free Zone, ruled by Pétain's government in Vichy. Allied successes in 1942 led the Germans to seize the Free Zone, but throughout Vichy retained control of economic policy for the whole country.

International trade between France and the Reich was restructured with a bilateral clearing agreement that overvalued the Reichsmark by approximately 50%, rendering French goods cheap for the German army. While this agreement produced a transfer to Germany of 120 billion francs, it was modest relative to the occupation indemnity. The Banque de France was compelled to credit the account of occupation authorities with 20 million Reichsmarks or 400 million francs per day, yielding a rapid monetary expansion. After continued German victories, daily credits were cut to 15 million Reichsmarks or 300 million francs. This moderation ended when Blitzkrieg failed to deliver the Soviet Union to the Reich, forcing a complete mobilization of Germany and its satellites for war.

The occupation costs, including bilateral trade credits, produced inflationary pressure as the German authorities purchased weapons and other goods. Although allowed considerable policy discretion, Vichy's finance ministers did not seek to undermine the German exactions and believed that an accommodating French government would be less onerous than direct German administration. To reduce the growing stock of currency, Vichy introduced a policy (the politique de circuit) to "close the circuit" by selling bonds to repay the Banque de France. Bonds were promoted with public campaigns, banks were forced to buy them, and the capital markets were squeezed. To keep the cost of financing low, the Banque de France pegged the price of long-term bonds to have an approximate yield of 3%. In addition, taxes were raised and collection procedures were improved. Wage and price controls, introduced in 1939, were strengthened; and real wages fell far below their pre-war level. Controls led to shortages, rationing and a thriving black market.

France's capacity to pay was weakened by the extraction of labor that reduced the pre-war labor force of 16.4 million. After the armistice, Germany retained half of its two million French POWs. When Germany moved to full-scale mobilization in mid-1942, Hitler ordered the conscription of French labor. Vichy offered a program to exchange three workers for each POW, but when it failed, a labor draft was instituted. By the end of 1943, French POWs and civilian workers in Germany reached 1.4 million.

II. A Model of Occupation Payments

To assess Vichy's strategy to pay for occupation, we extend Ohanian's (1997) and McGrattan and Ohanian's (2003) basic neoclassical model of a wartime economy to include money, wages and price controls, and a stabilization program. In the model, identical, infinitely-lived households own competitive firms that produce a single non-

durable good. Households are endowed with one unit of time per period, which can be spent for leisure l_t or labor n_t. The household lifetime utility function is:

$$(1) \qquad\qquad V = \sum_{t=0}^{\infty} \beta^t\, u(c_t, M_{t+1}/P_t, l_t) \qquad\qquad 0<\beta<1$$

which depends on consumption c_t, real cash balances M_{t+1}/P_t, and leisure l_t. For the period utility function u, we adopt the functional form:

$$(2) \qquad u = a \ln(c_t) + (1\text{-}a)\ln(m_t) + \Psi\, l_t^{1-\eta} / (1\text{-}\eta) \qquad 0<a<1,\ \Psi>0,\ \eta>0,\ \eta\neq1$$

The last term becomes $\Psi \ln(l_t)$ when the labor supply elasticity η takes the value of one.

Households begin period t with k_t units of capital, B_t units of government bonds and M_t units of money. They rent out labor and capital at the wage and rental rates W_t, and Q_t, and receive profits Z_t and the bonds revenue $(1+r_t) B_t$. They pay taxes, purchase goods, invest in capital and new government bonds, and modify their cash balances. They have a budget constraint:

$$(3) \qquad (1\text{-}\tau_{nt})\, W_t\, n_t + (1-\tau_{kt})\, Q_t\, k_t + Z_t + [1 + r_t\, (1-\tau_{bt})]\, B_t =$$

$$P_t\, c_t + P_t\, [k_{t+1} - (1\text{-}\delta)\, k_t] + P_t\, nx_t + T_t + B_{t+1} + M_{t+1} - M_t$$

where τ_{nt}, τ_{kt}, τ_{bt}, and T_t are tax rates on labor, capital and bonds and lump-sum taxes.

Firms rent labor and capital, and produce consumption and investment goods with the Cobb-Douglas production function:

$$(4) \qquad\qquad\qquad y_t = k_t^{\theta}\, (A_t n_t)^{1-\theta} \qquad\qquad 0<\theta<1$$

where the labor-augmenting technology A_t grows at the constant rate. Firms act competitively to maximize profits $Z_t = P_t y_t - W_t n_t - Q_t k_t$.

The government budget constraint is:

$$(5) \qquad P_t\, g_t + (1+r_t)\, B_t = \tau_{nt}\, W_t\, n_t + \tau_{kt}\, Q_t\, k_t + \tau_{bt}\, r_t\, B_t + T_t + B_{t+1} + M_{t+1} - M_t.$$

A competitive equilibrium is a set of sequences of quantities and prices such that: given prices, households and firms solve their optimization problems; the government's period budget constraints are satisfied; and the labor, capital, goods and bonds markets clear. By setting wage and price controls, the government determined the real wage, leaving households to decide on how much labor to supply. To model the wage controls imposed during the war, we then consider an alternative equilibrium, characterized by the share, λ, of the economy subject to wage and price controls. In each war year, the real wage is set equal to a weighted average of the exogenously controlled wage and the competitive market wage. While labor supply is determined by the households, labor demand is set by firms subject to a wartime rationing constraint, requiring their labor demand not to be larger than average (per firm) labor supply.

To solve the model, we use the shooting algorithm (Ljunqvist and Sargent, 2004). The steady state of the model approximates the pre-World War I averages of a 2% real GDP growth rate, a 4% real interest rate, a 10% ratio of government expenditures to GDP, 11% tax rates, a ratio of debt to GDP of 80%, and a ratio of M2 to GDP of 40% (See Occhino, Oosterlinck, and White, 2006 for the data sources.) Although not explicitly modeled, the steady state exchange rate regime should be a gold standard, approximated by setting net exports (exogenously controlled by the Nazis) and inflation equal to zero. The values for the labor drafted to Germany, tax rates, lump-sum taxes, government expenditure, net exports and money supply are treated as exogenously determined and matched with data during the War, as are the initial values for capital, bonds and money.

An explicit stabilization policy is required by our model, otherwise an immediate return to steady state policies would cause the debt to grow explosively because the

5

surplus is insufficient to cover war-generated interest payments. To measure the size of the stabilization package required to move the economy back to its steady state path, we assume that lump-sum taxes are levied and money is withdrawn so that debt and money return to their steady state levels at the end of a five-year period, which approximates the post-World War I stabilization plans for Britain and France.

IV. An Assessment of Wartime Finance

Figure 1 shows the behavior in our model of output, consumption, debt and money, normalizing so that the steady state output is one; other variables are presented relative to this benchmark. The dotted lines represent the steady state growth path for each variable and the starred lines the path of the observed variable, where it was available. The behavior of the real sector with a competitive labor market is shown by a dashed line and by a solid line for a labor market subject to wage and price controls. It should be noted that the collapse of output is less than the decline officially recorded, as the data does not include black market activity.

Debt and money begin at their sustainable steady state ratios of 0.864 and 0.40. During the war, the debt to income ratio and real money climbed as part of the efforts of Vichy to finance the war. The closeness of our estimates is surprising since our model has a non-distortionary stabilization program in contrast to the postwar inflationary policies. The calibrated real money, velocity and debt track the realized values though inflation is below the observed rate. Given the large accumulated occupation debt, the five year stabilization program of lump sum taxes that was needed to bring the end-of-war debt down to the sustainable debt to GDP level was equal to 97% of steady state GDP. No such tax scheme was introduced and instead, inflation surged, reducing the real value of the debt to 53 percent of GDP in 1950, well below the steady state level.

6

Welfare cost is measured as the additional permanent annual consumption that would make up the difference between the wartime consumption and the steady state economy over a twenty year period.   The total annual cost of the wartime policies would have been 19.96% of consumption with a non-distortionary stabilization program. Setting all other variables at their steady state levels and imposing a single distortion gives a measure of the independent effects.   Retention of POWs and the labor draft reduced consumption by 3.1% and wage and price controls by 2.5%. Occupation payments accounted for 16.3%, with small costs from taxation and money growth. Additional calibrations show that Vichy could not have raised tax rates high enough to eliminate the need for a stabilization program because of Laffer curve effects.

Given the huge debt and money overhangs, how could Vichy have managed in a postwar world dominated by Nazi Germany?   At the war's conclusion in 1944, occupation payments ceased, trade would have been limited and the debt would have been managed without access to world capital markets, requiring large budget surpluses. In essence, we assume that Vichy would have raised taxes to pay down the debt to its steady state level.   Increasing tax rates to 30% for twenty years would have been necessary, imposing an additional welfare cost of 7.0%, which should be added to the wartime cost of 19.9% for a total reduction in consumption of 26.9%.

In fact, post-World War II tax rates on labor (31%) and capital (27%) would have been sufficient to finance the accumulated debt. However, government expenditures on the postwar welfare state increased to absorb this revenue. The stabilization policies adopted by liberated France rested instead on inflationary finance. Inflation rose to over 50% before falling to 1.4% in 1949.   This inflation-default cut the debt overhang from 181% of GDP in 1944 to 51% in 1950.   The Marshall Plan made only a modest

contribution to this adjustment, lowering the consumption loss by roughly 1%. The burden of the inflation-led adjustment was borne heavily by bond holders, especially the banks and other financial institutions.

V. Conclusion

Occupied France managed an unprecedented transfer of resources. In our calibrations, we assume that the war ended in 1944, but even if the Vichy government made its policy choices under the most optimistic scenario, where the war ended in 1942, the occupation would have imposed a 12.6% reduction of consumption for twenty years plus the cost of financing a debt overhang equal to 88% of steady state GDP. These costs are only moderately lower than our benchmark occupation cost of a 19.9% reduction in consumption and debt overhang of 97% of GDP.

If Vichy had retained power, it could have eliminated the debt overhang in twenty years at an additional annual cost of 7% of consumption by raising taxes. Tax rates rose to the requisite levels, but the surplus needed to pay down the debt never appeared because of reconstruction and welfare state expenditures. A repressive Vichy regime might have managed a tax-based debt reduction if there had been a German victory, but the divisive democracy that emerged after 1944 could not. The rapid and probably unexpected inflation of 1946-1948 reduced the debt below its steady state level. This inflation-default was not selective but hit all who had willingly or otherwise propped up the collaborationist government. Reconstruction and stabilization was further aided when France regained access to international capital markets and intergovernmental loans.

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Figure 1