10. World War II: Economic Warfare

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EC224 War and Economy in the Twentieth Century

The Air-Sea Battle

World War II on land

- The strategic business of ground forces in World War II was the conquest of territory.
- The great powers put tens of millions of soldiers into their armies.
- Armies fought continuously, with occasional spectacular battles on fronts that were hundreds of kilometres wide and dozens of kilometres deep.
- In the great land battles, millions of soldiers' lives were lost.
- In the great land battles, equipment losses were barely noticeable compared to production.

World War II at sea and in the air

- The strategic business of ships and planes was economic warfare.
- The great powers put at least two thirds of equipment into the air-sea battle (exc. USSR).
- Ships and planes fought continuously on fronts that were thousands of kilometres wide, hundreds of kilometres deep, from sea bottom to stratosphere.
- The air-sea battle killed relatively small numbers of soldiers and millions of civilians.
- The air-sea battle accounted for most equipment destroyed on the front line, or in deployment (before reaching the front), or in production, or before production.

Source: Based on O'Brien (2015), as reviewed by Harrison (2016).

The Air-Sea Battle

An incomplete count of losses directly attributable to economic warfare:

- Submarine warfare

  Germany: 28,000 submarine crew (and 781 submarines).

  Allies: 30,000 shipping crew (and 14.5m gross tons of shipping).

- Strategic bombing

  Allies 100,000 aircrew (and 18,200 aircraft); 60,000 British civilians.

  Germany 750,000 to 1m civilians.

  Japan 350,000 civilians.

Sources: Compton-Hall (1995) and Davis and Engerman (2006) give losses in the Battle of the Atlantic. Falk (1995) gives Allied and German losses in the bomber offensive. The Japanese figure is for all civilian casualties, most of whom died in bombing raids; to 100,000 casualties of conventional bombing are added 250,000 for the highly uncertain numbers that died in and after the atomic bombing of Hiroshima and Nagasaki).

Blockade

Britain instituted a blockade of Germany immediately on the outbreak of war.

- The blockade was relatively bloodless:
- German war fleet was bottled up in ports or hiding in fjords.
- Enforced on neutral countries by blacklisting and certification (as WW1).

Hitler expected it and had ready responses:

- Germany had become committed to trade within a colonial bloc of the poorest nations in Europe.
- Germany expected to gain from predation not specialization: squeeze wages of food producers to subsistence or below, eliminate food consumers (as previous lecture).
- So, food and oil security through conquest.

Blockade

Germany started submarine blockade of the UK immediately, without any period of phoney war.

UK continued to rely on imported food and fuels.

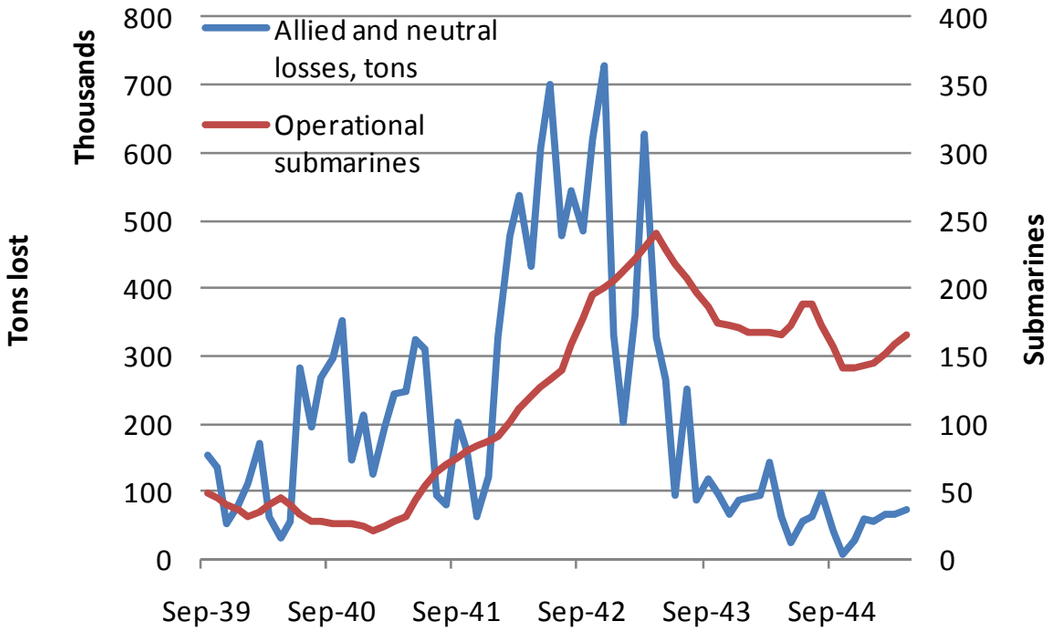
General mobilization, shortage, and overfull employment reduced the scope for substitution to replace missing imports from domestic output.

Potential gains to UK from overseas trade:

- UK was somewhat smaller than Germany in both population and GDP.
- But could compensate through trade based on specialization and comparative advantage.
- Trading with world's most developed industrial power for munitions.
- Trading with world's cheapest sources of food and raw materials.
- Unless Germany could prevent it through blockade.

Battle of the Atlantic: Tactical Outcomes

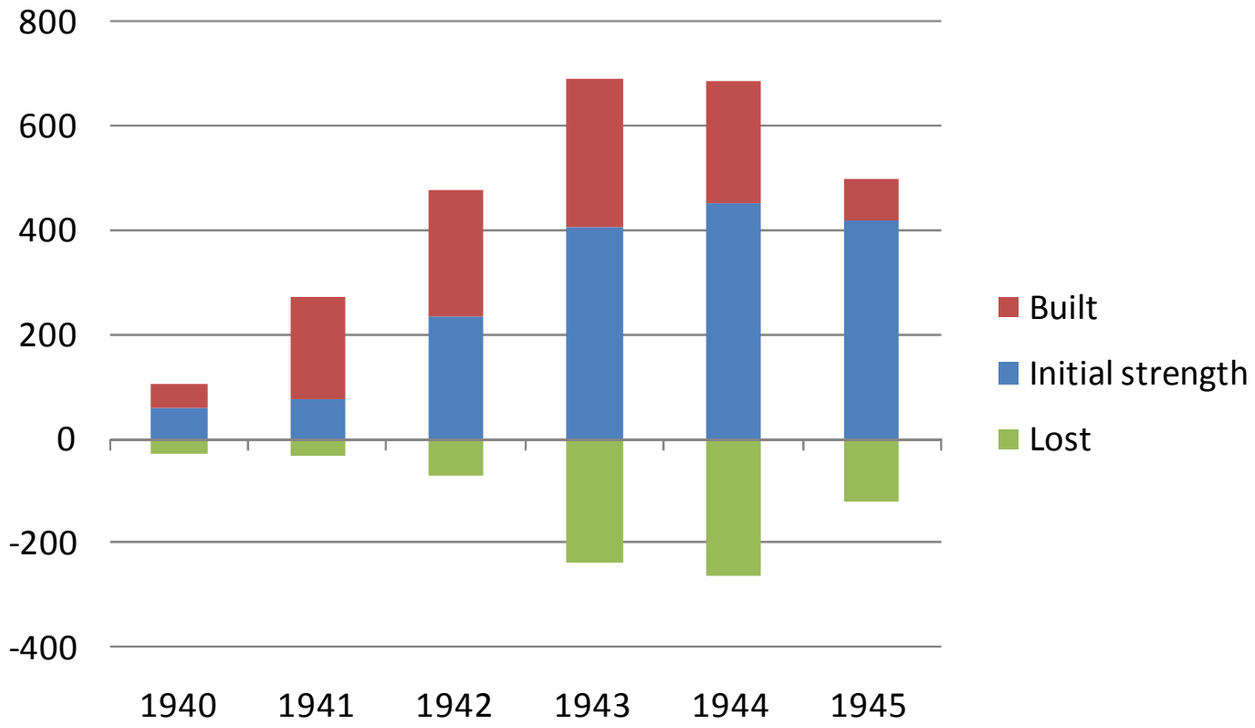
Tactical outcomes:



Source: Data from Davis and Engerman (2006, pp. 298-300).

Battle of the Atlantic: Tactical Outcomes

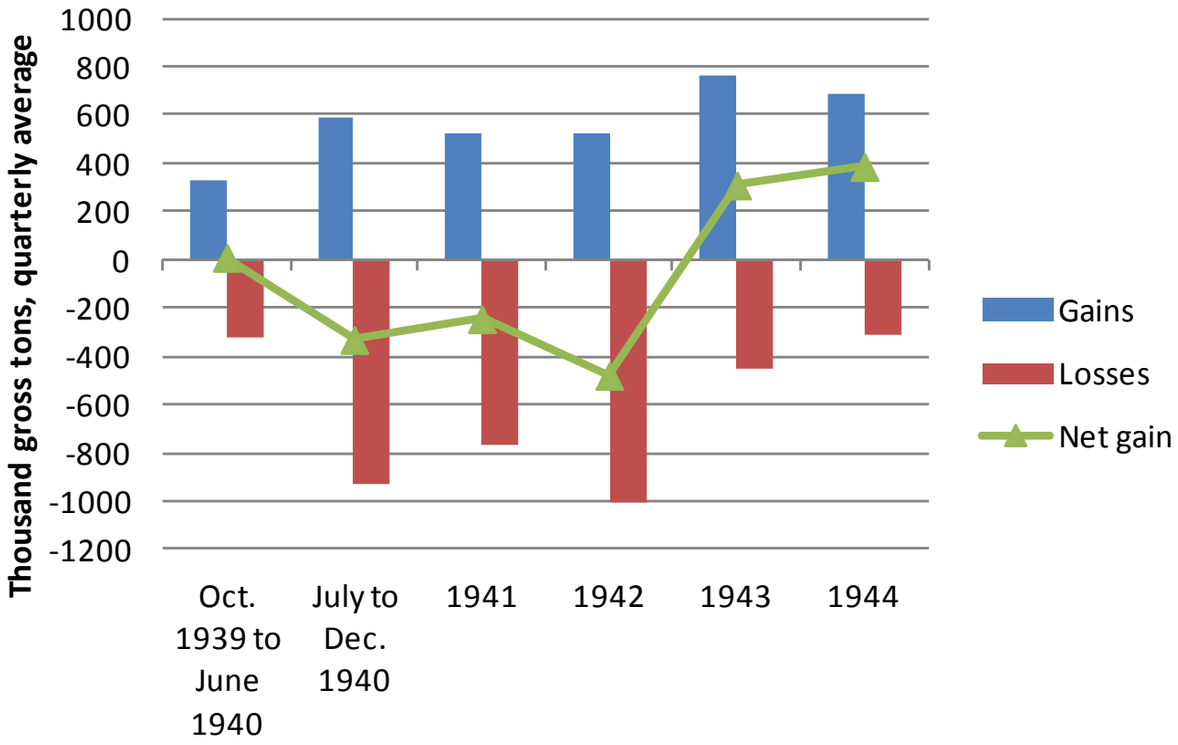
Germany's submarine strength:



Source: Michel (1975, p. 613).

Battle of the Atlantic: Tactical Outcomes

Gains and losses of British flag shipping:



Source: Taken or calculated from Hancock and Gowing (1949, pp. 205, 354-5). Gains are new vessels plus acquisition of foreign tonnage. The British flag shipping fleet of June 1940 was around 19.5 million deadweight tons (p. 250).

- Remember: this shows the tactical outcomes of blockade, not the strategic outcomes.

Battle of the Atlantic: The Story

The story: In 1939:

- Immediate introduction of convoy system limited early losses.
- Did not prevent immediate import crisis.

In 1940:

- Fall of France → defection of French fleet plus German air and naval bases in France
- Italy enters the war (100 submarines).
- Longer, more devious shipping routes.
- Shortage of escorts → larger, slower convoys than in WW1.
- Closure of east coast ports → congestion of Clydeside, Merseyside, Bristol, and inland transport.
- June 1940 to Dec. 1941: losses of British flag tonnage reached 5m deadweight tons > 25% of June 1940 tonnage.

Battle of the Atlantic: The Story

Churchill in December 1940 (cited by Hancock and Gowing 1949, p. 254):

> "The decision for 1941 lies upon the seas. Unless we can establish our ability to feed this Island, to import the munitions of all kinds which we need, unless we can move our armies to the various theatres where Hitler and his confederate Mussolini must be met, and maintain them there, and do all this with the assurance of being able to carry on till the spirit of the Continental Dictators is broken, we may fall by the way ... It is, therefore, in shipping and in the power to transport across the oceans, particularly the Atlantic Ocean, that in 1941 the crunch of the whole war will be found."

Battle of the Atlantic: The Story

In 1942:

- The US Navy did not get importance of convoys.
- With US entry into war, losses rose.
- To monthly average at worst level (600,000 tons/month) of WW1.
- British shipping shortage at most critical.
- UK import program acquired equal priority with service needs.
- But stocks were maintained.

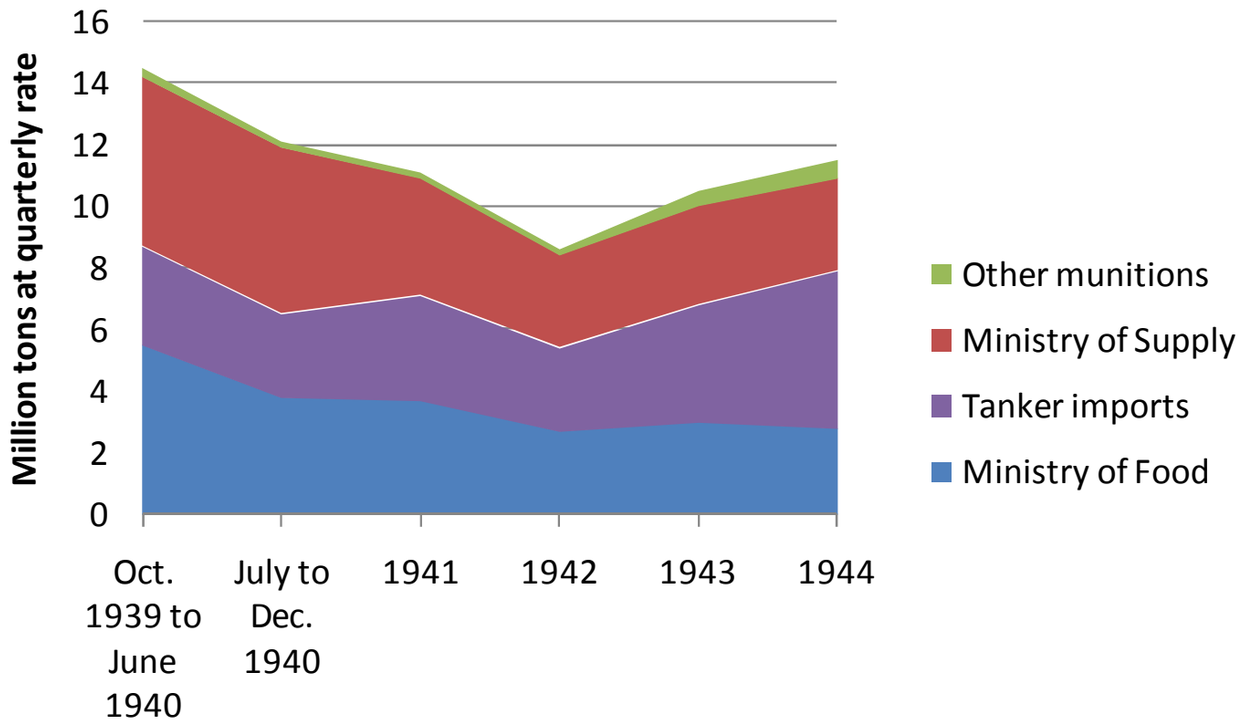
In 1943:

- US shipbuilding capacity began to tell.
- And Allied air strength.
- And radar.

But did Britain starve?

Effects of Blockade on the UK

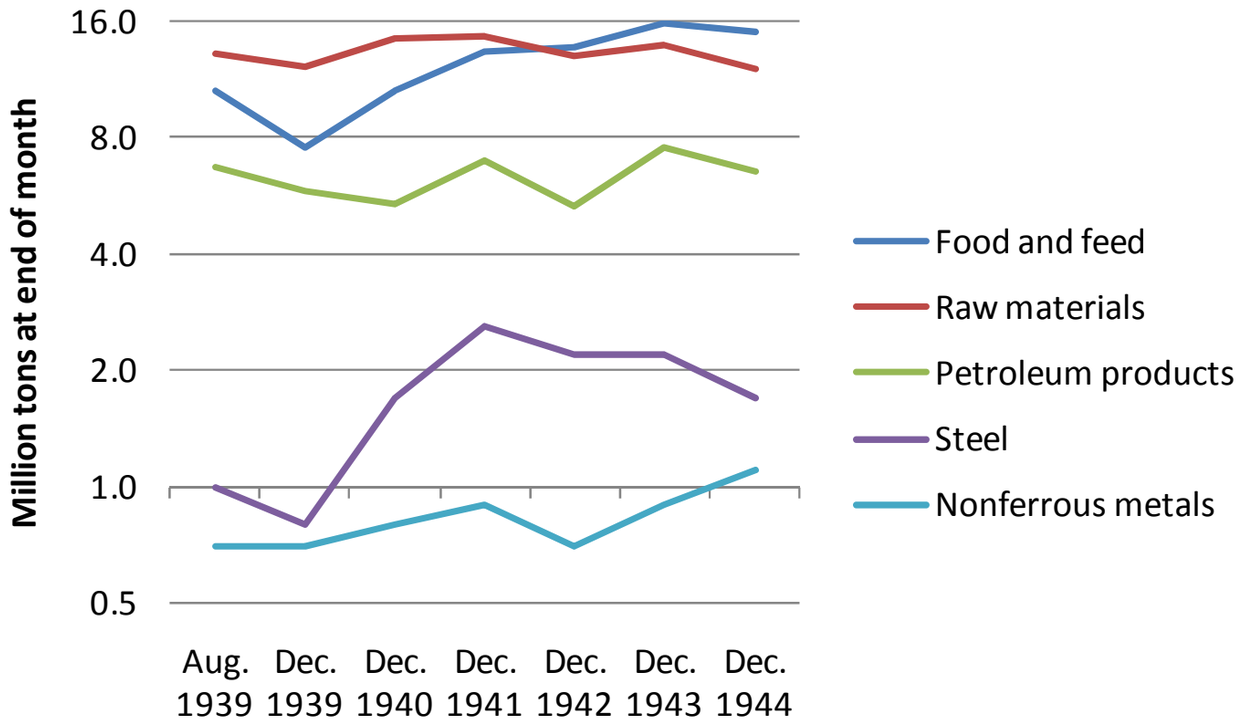
UK overseas imports by departmental programs:



Source: Taken or calculated from Hancock and Gowing (1949, pp. 206, 357).

Effects of Blockade on the UK

UK stocks of food and raw materials:



Source: Hancock and Gowing (1949, pp. 207, 358).

Effects of Blockade on the UK

Substitution and nationalism:

Production: substituting home goods for imported goods.

- Import program of Ministry of Food 22.5m tons (annual rate) late 1939 $\rightarrow$ 6m tons (annual rate) in early 1943.
- Domestic net output of energy for human consumption 14.7 billion kcals (1938/39) $\rightarrow$ 28.1 billion kcals (1943/44).

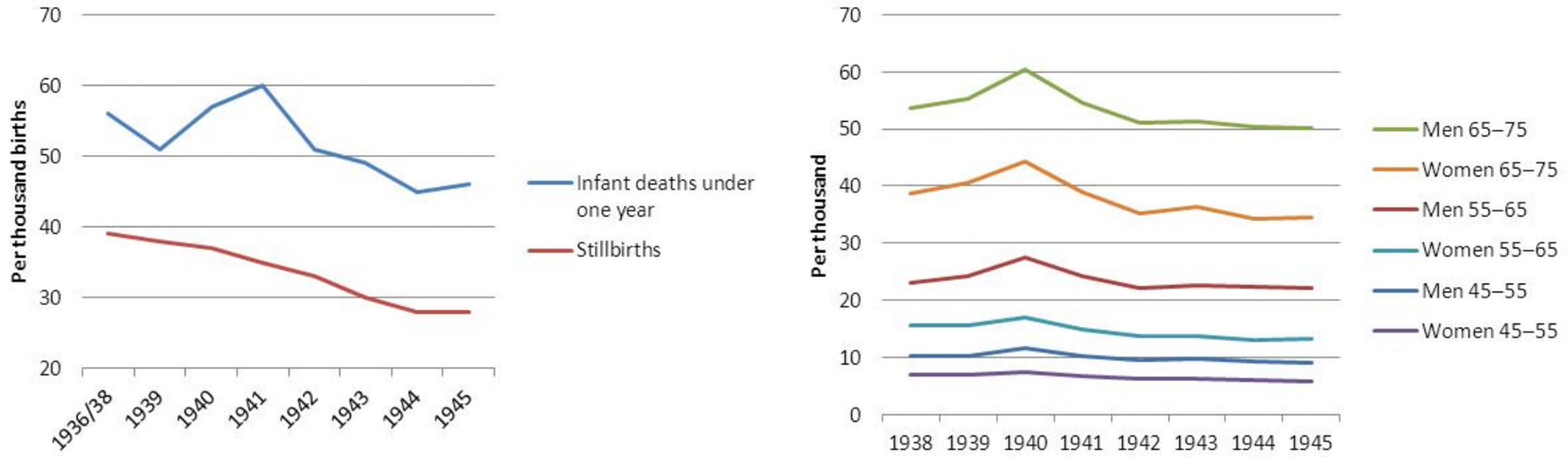
Consumption: going without meat.

- Eliminating imported animal fodder.
- Converting home arable from fodder crops for livestock to cereals and vegetables for human consumption.

Effects on health?

Effects of Blockade on the UK

Civilian mortality indicators, England and Wales:



Source: Titmuss (1950, pp. 521, 524). Adult death rates are for civilians only and from all causes excluding operations of war.

- Note: There was a pre-existing trend of improvement, so what can be said is that the war did not prevent improvement from continuing.

Bombing Germany: Expectations

Could long-range bombers destroy the German economy from the air?

Prewar expectations

- Penetration: “The bomber will always get through.”
- Precision: the B-17 Flying Fortress designed to drop bombs within a 25-foot circle from 20,000 feet.
- Destructiveness: Forecast that, in two months of war, German bombing of the UK would kill 600,000 and injure 1.2m (Titmuss 1950, p. 13).
- Economic effects: Believed that the German economy was already close to breaking point.

Churchill in 1940:

- “The Navy can lose us the war, but only the Air Force can win it. Therefore our supreme effort must be to gain overwhelming mastery in the air. The Fighters are our salvation, but the Bombers alone provide the means of victory. We must therefore develop the power to carry an ever increasing volume of explosives to Germany, so as to pulverise the entire industrial and scientific structure on which the war effort and economic life of the enemy depends.”

Bombing Germany: A Reality Check

Targeting Germany's "industrial and scientific structure" turned out to be more difficult than expected.

Germany could be bombed by night and day.

Experience of daylight bombing, 1940 to 1943:

- Daylight allowed precision.
- But difficult to reach the target: air defence (fighter aircraft and AA guns) inflicted heavy losses after all.

Experience of bombing at night, 1940/41:

- One third of RAF night bombers never found the target.
- One third got inside 5 miles.
- Fewer Germans killed than RAF personnel.
- Safer for everyone.

Bombing Germany: Adaptation

In February 1942, strategic objectives were rewritten to match tactical realities:

- Bombing would be carried on at night.
- Against what targets: the smallest targets a night bomber formation could reliably identify and attack.
- A medium sized industrial city of the Ruhr, or a larger one like Berline.
- But at night it was impossible to pinpoint Germany's "industrial and scientific structure."

Then for what purpose?

- Generalised economic disruption.
- Damage to worker morale.
- Revenge for the 1940/41 Blitz (40,000 British deaths).
- Be seen to be doing something.
- Oh, and win the war before the Americans come and do it for us (Sir Arthur Harris, chief of Bomber Command from February 1942).

Bombing Germany: Area Bombing

RAF Bomber Command pursued area bombing relentlessly.

The U.S. 8th Air Force persisted (and failed) with daylight precision bombing and went along with area bombing reluctantly.

- German cities were pounded night after night.
- From 1942, thousand-bomber raids on Cologne, Dortmund, Duisberg, Essen, Hamburg, and other cities.

Until April 1944, when a return to daylight bombing became necessary, possible, and desirable.

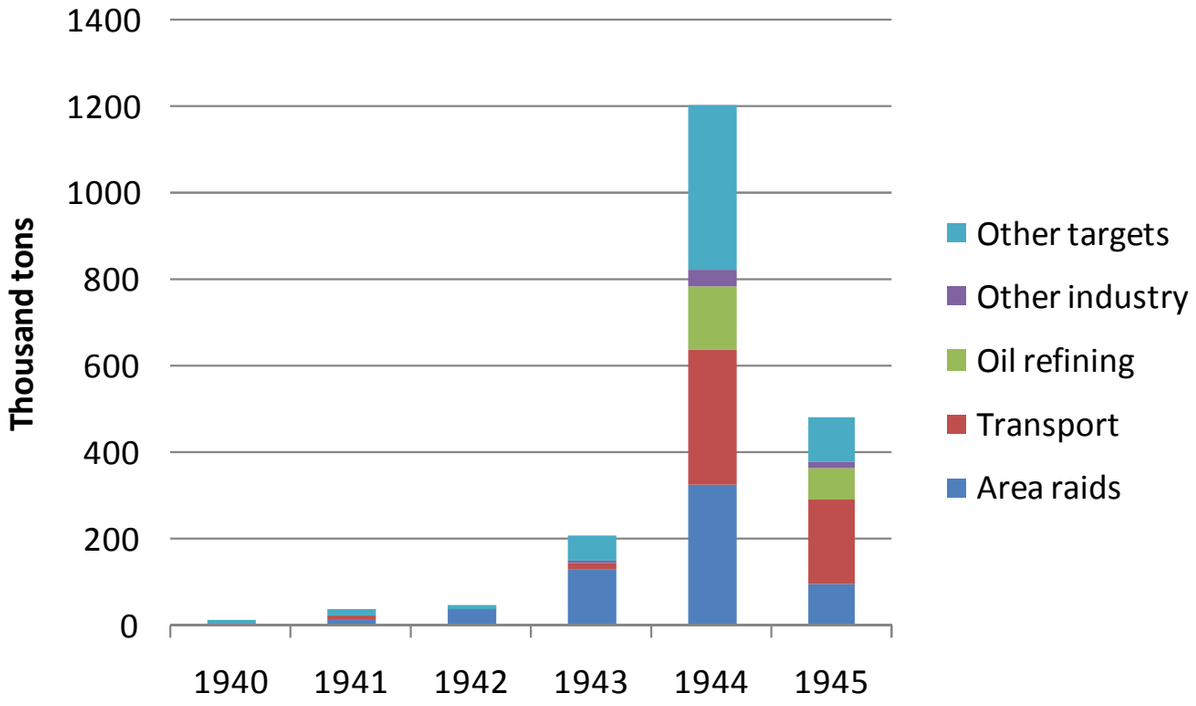
- Necessary: German radar removed the protection of darkness.
- Possible: Increased Allied capacity protected by long range U.S. fighter escorts.
- Desirable: Support for invasion of Europe.

Area bombing continued, but new targets were added.

- Oil hydrogenation plant for aviation fuel.
- Aeroengine capacity.
- Transport and coal supplies.

Bombing Germany: Summary

The combined bomber offensive:



Source: Zilbert (1981, p. 29). Bombing by the U.S. 8th and 15th Air Forces and RAF Bomber Command added up to 74% of overall tonnage of bombs dropped on Europe by the western Allies. The largest category of “Other targets” was airfields.

Effects of Strategic Bombing on Germany

Direct effects in 1942/43 were few (based on U.S. Strategic Bombing Survey 1945).

- Raw materials not easily damaged.
- Machinery damaged only by direct hit.
- Knocking down factory roofs and walls did not impede war production.
- Processing plants hard to hit (aluminium) or easily rebuilt (oil hydrogenation).
- Assembly plants and finished products dispersed or moved underground.

Substitution and nationalism: the German economy contained unanticipated reserves.

- Gross investment in industry fixed assets > capacity destroyed by bombing (Abelshauser 1998: 168).
- Despite bombing, German war production tripled from 1941 to 1944.
- Flattening cities released workers from civil employment for war production.
- Initial demoralisation was followed by habituation and stiffened national feeling.

But this did nothing for learning, rationalization, and economies of scale.

Effects of Strategic Bombing on Germany

From September 1944 repeated precision bombing of industrial targets began to set off vicious circles.

- Bombing oil capacity ⇒ shortage of aviation fuel for air defence ⇒ easier bomber penetration.
- Bombing aeroengine plants ⇒ delays in finishing fighter airplanes ⇒ easier bomber penetration to targets.
- Bombing railway marshalling yards ⇒ disruption of supplies for industry ⇒ shortages of coal and railway goods ⇒ further disruption of rail transport.

The reduction in German war production in 1944 that was attributed to Allied bombing:

	Allied estimates	German estimates
Aircraft	-19%	-31%
Tanks	-16.5%	-35%
Guns	-14%	…
Trucks	…	-42%

Source: Overy (1994: 374).

Effects of Strategic Bombing on Germany

Indirect effects of bombing were also important:

- Higher unit costs of German war production: dispersal of facilities was at the expense of economies of scale and rationalization.
- For the sake of oil, German ground forces were diverted from core objectives to Romania and the Caucasus.
- For the sake of air defence in the West, German air power was diverted from the East.
- Air defence: by mid-1944, air defence output accounted for one third of German munitions (and so exceeded total 1941 rate of war production).

What We Have Learned

Effects of economic warfare:

- Tactical effects were steps towards a strategic goal:
- The strategic goal was to raise the adversary's costs of economic mobilization.

As in WW1, economic warfare proved to be a complement to warfare, not a substitute for it.

Strategic effects could be understood only after taking into account the adversary's response.

- Scope for substitution.
- Effects on national feeling.
- Defensive counter-measures.

Counter-measures also had high opportunity costs.

- Dispersing and defending production facilities.
- Counter-attack (including conquest).

What We Have Learned

Economic warfare was an important dimension of a continuous air-sea battle that spanned continents and oceans.

Germany's submarine warfare against the Allies was a strategic failure.

The Allied air war against Germany and Japan was a strategic success:

- Until 1944, direct effects were small.
- Indirect effects included forcing Germany to divert air power from the East.
- And to incur costs of air defence.
- From 1944, direct effects were larger and arose in combination with the progress of the battle for Europe.
- These gradually raised cost to Germany of economic mobilization beyond the sustainable level.

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