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Rules and Policy Equivalence, 1821–1844**

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Monetary Rules and Policy Equivalence, 1821–1844

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Abstract

The Peel Act of 1844 is often portrayed as the legal embodiment of David Ricardo's monetary ideas. This paper argues that it was not. Ricardo's final proposal regulated note issue through market signals—the value of paper relative to gold and the foreign exchanges—whereas Peel imposed a quantity constraint tied to bullion reserves. Using monthly circulation data and quotation-level foreign exchange and gold data, the paper evaluates whether these different rules were policy-equivalent over 1821–1844. Because Bank of England operations distorted the post-1822 London gold quotation, Ricardo's rule is implemented primarily with the Paris sight rate, with Hamburg used as an additional quotation-level check through 1827. The Peel Act would have bound in 26 of 280 monthly observations. In none of those 26 cases does Ricardo's rule call for contraction under transaction-cost bands ranging from 0.5 to 1.5 percent. In December 1825 the divergence is especially clear: on the monthly-average data, the Peel Act rule would have required a contraction in note circulation of almost 30%, while Ricardo's rule called for expansion as the foreign exchanges indicated conditions favorable to bullion inflow into London.

JEL Classification: B12, E42, E51, E58, N131.

Key words: David Ricardo, Peel Act, Currency School, Banking School.

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1. Introduction

Was the Peel Act of 1844 Ricardian? This is one of the unsettled questions of the history of economic thought.¹ A long line of eminent authors has treated the Act as the culmination of Ricardo's monetary ideas and the embodiment of his 1823 proposal separating credit from note issuance. An equally distinguished list of writers reject a direct connection between Ricardo's later doctrines and those of the Currency School and emphasize major differences in institutional design. Often overlooked in the debate is the different way in which both rules deal with changes in money demand. Ricardo (1816, 1824) proposed regulating note issuance to stabilize the market price of gold. The Peel Act instead established a rigid rule that limited issuance above £14 million unless matched by an equivalent increase in bullion reserves. Ricardo's price rule allowed paper to respond elastically to changes in monetary demand so long as the market price of gold remained stable. The Peel Act did not.

What has been absent from the debate is an attempt to answer a simple question: would the Peel Act and Ricardo's proposal prescribe the same policy response under the same circumstances? The originality of this paper lies in answering that question empirically through a counterfactual comparison of the policy prescriptions implied by the two rules during the period of 1821-1844, when the pound was freely convertible into gold.

Contemporary supporters and opponents of the Peel Act resorted to counterfactual analysis of its operation during earlier crises, particularly those of 1825 and 1837, to argue for or against it (see, for example, Loyd, 1844, 21–46 and Wilson, 1847, 108–117). This paper extends the methodology in two dimensions. First, it systematically simulates the operation of the Peel Act using monthly

¹ The Peel Act of 1819 was most certainly Ricardian as it restored the convertibility of Bank of England notes into gold, a policy Ricardo had advocated for almost a decade.

circulation and bullion-reserve data from April 1821, when convertibility into gold was restored, through July 1844, immediately before the Act came into force, paying special attention to the crises of 1825 and 1837. Second, it introduces Ricardo's rule into the counterfactual analysis using quotation-level market data.

The paper proceeds as follows. Section 2 reviews the divided literature on the relationship between Ricardo, the Currency School, and the Peel Act. Section 3 reconstructs Ricardo's 1816 proposal and, more importantly, his final 1823 rule, drawing also on his *Principles* and correspondence, and contrasts them with the quantity constraint imposed by Peel. Section 4 describes the data and empirical strategy, and reports the results of the full-sample comparison with special emphasis on the crises of 1825 and 1837. Section 5 concludes. The Appendix describes the data and coding and reports the principal full-sample comparisons.

2. Literature Review

The Peel Act has traditionally been placed at the end of an intellectual evolution beginning with the bullionist controversy and David Ricardo in the early 19th century, continuing through the development of the Currency Principle in the 1820s and 1830s and the Currency School in the late 1830s and early 1840s.

The strongest contemporary evidence for this genealogy comes from Torrens (1848), who asserted that the main propositions held by the Currency School were based on “the works of Adam Smith and of Ricardo,” to which were added the contributions of McCulloch, Loyd, and Norman (p.78).² A decade later Marx ([1859] 1970, 165–66) wrote that Torrens and Loyd (later baron Overstone)

² Such a clear indication of intellectual debt to Ricardo was absent from Torrens' earlier pamphlets (1837, 1844).

had taken Ricardo's "wrong assumption" about money and "pressed [it] into their service and turned into a fundamental principle of Sir Robert Peel's bank legislation of 1844 and 1845". Courcelle-Seneuil (1864), a leading French monetary theorist of the nineteenth century, considered Ricardo and Peel as members of the Currency School (*école métallique*). He noted that although superficially, Ricardo's 1823 proposal "differed significantly" from the Peel Act, "its distinctive feature... is the exact limitation of the fiduciary circulation and the prohibition against issuing bearer notes—beyond a certain amount—except against a deposit of gold; this is also the characteristic and distinguishing feature of the system established by Sir Robert Peel" (p. 383).

According to Fisher (1936, p. 45) in drafting the Act, Sir Robert Peel followed "earlier recommendations by banker-economist, Ricardo". Viner (1937, p.223) claimed that the Currency School theorists were not aware that their Currency Principle "could derive support from Ricardo". Rist ([1938] 1966, 171–175) argued that Ricardo (1816) contained the "essential features" of the Peel Act and attributed to him what he regarded as the fundamental errors of this legislation. Morgan (1943, p.128) claimed that the Currency School theorists "were the heirs of Ricardo". Horsefield (1944) described the Peel Act as the application of bullionist principles associated with Ricardo to the Palmer rule and the separation of note issue from banking directly from Ricardo (1824).

According to Sayers (1953, p. 46) Ricardo could be regarded as "the father of the system" in the Peel Act. Hicks (1967, p. viii) identified him as the leader of the Currency School, which he characterized by its adherence to automatic monetary rules and included Mises, Hayek and Friedman as his successors. Blaug (1968, p.201) asserted that Ricardo "laid down the currency principle". Despite challenging several conventional interpretations of Ricardo's monetary theory,

More recently, Goodhart and Jensen (2015) argued that the separation of money creation from financial intermediation proposed by Ricardo was the “key Currency School position” incorporated in the Peel Act. They also claimed that rules are what distinguish the Currency School from the Banking School (from their perspective, Ricardo’s “gold standard rule” is no different from Friedman’s k -percent rule). This is questionable since the Banking School also endorsed a strict rule: full convertibility at a fixed parity (see Mill’s comment below).

The “Peel Act as Ricardian” hypothesis has been challenged or qualified by a list of equally eminent authors. At its head is Sir Robert Peel who when introducing the bill in Parliament, pointed out that Smith and Ricardo held the view that immediate convertibility was sufficient to prevent excessive paper issue, but that it was “our duty to disregard their authority” based on “reason and experience” (Peel 1844). He also explicitly rejected Ricardo’s 1823 proposal, arguing that it was “the wisest course to select the Bank of England as that controlling and central body, rather than to appoint Commissioners acting under the authority of Parliament for the purpose of the issue of a Paper Currency” (Peel 1844).

Mill (1844a) explicitly placed Ricardo among the leading bullionists who had demonstrated during the Restriction Period that an inconvertible paper currency could be over-issued and depreciated, but that he clearly understood that on demand convertibility was enough to prevent such a scenario.³ Tooke (1844) also provides evidence against treating the Currency principle itself as Ricardian when he writes: “a new canon of currency has of late been promulgated by persons of no mean authority”. Commenting on his tract Mill (1844b) noted that the notion that the

³ Mill (1826) deplored that in the aftermath of the crisis of 1825 some members of the cabinet had adopted Ricardo’s conclusions without being fully acquainted with “the principles from which the opinions they have adopted are a deduction,” and were therefore “continually liable to make mistakes in the application.”

proposition that convertibility acted too slowly and therefore had to be supplemented by a mechanical rule governing note issue was “another doctrine” that had “sprung up” only in recent years. He considered the Currency School as a distinct intellectual innovation rather than a continuation of Ricardo’s doctrine. Wilson (1847, pp.44-45) included Ricardo among the list of “worthy” writers, who held that “immediate convertibility of notes into the coin they represent, at the option of the holder, would be at all times an infallible guarantee against any depreciation of their value”. Schumpeter (1954) claimed that McCulloch “overemphasized” the links of the Currency School with Ricardo, but when discussing the institutional mechanism of the Peel Act, McCulloch (1858) did not attribute it to Ricardo but to a “proposal made by Lord Overstone [Loyd] in 1837”.

Hayek ([1929] 1991, 234) recognized that Ricardo had anticipated the separation of note issue from banking but explicitly cautioned that the Peel Act “was not necessarily an outgrowth of Ricardo’s doctrine” even though many of his disciples supported it. In his view, some elements of the Currency School had Ricardian precedents, but the rule linking note issue to movements of bullion had an independent lineage, notably through Joplin (1832).⁴

Arnon (1987) argued that Ricardo’s final monetary proposal represented a significant departure from the position conventionally attributed to him. In contrast to his “so-called followers in the Currency School,” Ricardo allowed the issuing authority to alter its securities portfolio in response

⁴ As O’Brien (1993, 142–43) shows, Joplin had formulated his principle of “metallic fluctuation” by early 1823, before Ricardo’s death, and subsequently discussed his plan with Ricardo. In a letters sent to *The Courier* in 1823, Joplin unequivocally states that to truly represent metallic money, paper currency “ought to be governed by the same laws and consist at all times of the exact amount of Metallic Money that would be in circulation did no Paper exist.” (Joplin, 1825, p. 9). Ricardo must have been aware of this idea but did not incorporate it into his 1823 proposal. Instead, he modified the price-of-bullion rule developed in his 1816 Ingot Plan. Joplin (1840, p.1) asserted that he had shown Ricardo his plan before his death and that he “had highly approved it” and in fact had copied his plan “with his modifications.”

to developments in the gold market and the foreign exchanges. Arnon therefore characterized Ricardo's last position as involving discretion in the control of money, in contrast to the automatic rule favored by the Currency School. Arnon (2011, 148–51, 382–83) argued that Ricardo (1824) represented a significant break not only with his own earlier position but also with the Currency School. By allowing the issuing authority to alter the circulation through open-market operations in response to developments in the gold market and the foreign exchanges, Ricardo introduced what Arnon described as “all the elements of discretionary control.” In Arnon's interpretation, Ricardo's final position was therefore closer to discretionary central banking than to the automatic mechanism of the Peel Act.

Diatkine (1994) showed that under Ricardo's proposal the quantity of paper money was governed by a price rule, rather than by a reserve requirement as advocated by the Currency School. The issuing authority was required to stabilize the market price of gold by open market operations, but its circulation issue was not mechanically constrained by the amount of reserves. Marcuzzo and Rosselli (1994) shared this interpretation, despite also stating that “the Bank Charter Act of 1844 was inspired by his ideas.” Diatkine (2008) argued that Ricardo's monetary policy differed in important respects from the regime implemented by the Peel Act. This allowed the supply of currency to remain flexible while its value was anchored by the prescribed buying and selling prices for gold.

Deleplace (2008) compared Ricardo's 1816 and 1823 monetary plans and argued that their logic was “orthogonal” to that of the Peel Act. “It is clear that Ricardo's method of regulating note issue excluded any rationing based on the size of the metallic reserve, as occurred under the reform of the Bank of England inspired by the Currency Principle.” Deleplace (2020) placed this

interpretation within a broader historiographical divide between “orthodox” and “unorthodox” readings of Ricardo and emphasized that “there is no continuity between Ricardo’s plans and the Currency principle embodied in the 1844 Bank Charter Act.” Further evidence comes from Ricardo’s letter to Grenfell of 19 January 1823, in which he explicitly linked changes in Bank note issue to movements in the market price of the monetary standard; Deleplace, Depoortère, and Rieucan (2013) interpret this as part of Ricardo’s recurrent concern with the Bank’s discretionary power over the circulation.

To summarize, the literature therefore points to three distinct dimensions along which to assess the claim that the Peel Act was Ricardian. The first is theoretical. Although the ideas Ricardo developed during the bullionist controversy may have influenced the Currency School, they were no longer applicable once convertibility was restored in 1821.⁵ The second is institutional. Although Ricardo clearly anticipated the separation of note issue from banking, he rejected the notion of keeping both functions within the Bank of England, as the Peel Act did. The third, and most important for the present paper, concerns the rule governing note issue. Here the difference is fundamental. Ricardo’s final proposal made the quantity of paper respond to market signals—the price of gold and the foreign exchanges—whereas the Peel Act constrained note issue by the amount of bullion reserves. The empirical question examined below is whether, despite this structural difference, the two rules nevertheless generated the same policy prescriptions under the same historical conditions.

⁵ As Glasner (1989, 213) has pointed out, “the Currency-School argument betrayed an inadequate understanding of the domestic and the international adjustment processes for a competitive convertible currency”.

3. Issuance Rules

Policy equivalence is the null hypothesis tested in the paper. Ricardo's rule and the Peel Act need not have an identical institutional design to be Ricardian in a policymaking sense; they must, however, imply the same response under the same circumstances. The comparison is asymmetric in two respects. First, Ricardo specified a feedback rule, whereas Peel imposed a statutory constraint. Second, Ricardo's rule identified the direction of adjustment but not its precise magnitude, while the Peel Act, whenever binding, implied a determinate minimum contraction equal to the excess of note circulation over the statutory ceiling. When the Peel constraint was not binding, the Bank retained discretion. The empirical comparison therefore focuses first on direction: whenever Peel requires contraction, does Ricardo's rule call for contraction, expansion, or no forced adjustment? Where Peel binds, the magnitude of the required contraction can be calculated exactly, but Ricardo's rule does not supply a precise response.

3.1. Ricardo's Price-Based Reaction Function

Ricardo (1816) stated explicitly that the Bank of England should regulate its issues "solely by the price of bullion, and never by the quantity of their paper in circulation." In his view there was no independently observable appropriate quantity of money: "The quantity can never be too great nor too little, while it preserves the same value as the standard." The amount required by the economy depended on transactions and on the economy practiced in making payments. The governing principle was therefore to maintain the value of paper in terms of gold, not to target a predetermined quantity of notes. Ricardo (1816) also treated the foreign exchanges as evidence of the relative value of paper and gold and as a determinant of bullion movements, although he stated the Bank's operating rule in terms of the market price of bullion.

The rule specified that the Bank of England should sell standard gold bullion for notes at the Mint price of £3 17s 10½d per ounce and buy gold with notes at £3 17s. These prices established a comparatively wide band. The mechanism was contractionary at the upper transaction point and expansionary at the lower one. Ricardo also explained the intended feedback: if the Bank limited paper excessively, its value would rise; an addition to circulation would then lower its value and make it “again conform to the standard.” The same passages were reproduced in the third edition of the *Principles* ([1821]1951, 354-357).

Ricardo’s correspondence reinforces this interpretation. In September 1819 he described the object of policy as taking measures “to equalise the value of paper and gold” (Ricardo to Trower, 25 September 1819; Ricardo 1952a). In May 1820 he wrote that the value and amount of paper were best regulated by making it exchangeable for bullion at a fixed rate and explicitly noted that an increase of currency would lower its value (Ricardo to Sinclair, 11 May 1820; Ricardo 1952a). In December 1821, discussing the operation of his scheme with James Mill, he contemplated buying gold when it was cheap and then increasing issues, and rejected the idea of keeping the same quantity of paper in circulation regardless of circumstances (Ricardo to Mill, 18 December 1821; Ricardo 1952b). This correspondence confirms that the quantity of paper was the adjusting variable, while conformity with the metallic standard was the objective.

However, Ricardo did not regard the market price of gold as a measure of the absolute value of either gold or the currency; it measured only their value relative to one another. In December 1822 he objected to being represented as holding that “the price of gold bullion is a sure test of the value of bullion and currency” (Ricardo to Malthus, 16 December 1822; Ricardo 1952b). Its relevance was narrower: the market price of gold indicated whether paper was trading in conformity with

the metallic standard. Consistently, in March and May 1823 he described the objective as making paper agree, or “equaliz[e] itself with the value of gold” (Ricardo to McCulloch, 25 March and 3 May 1823; Ricardo 1952b).

Ricardo (1824) maintained this principle but narrowed the intervention band and made the feedback rule more explicit. The Commissioners were to issue paper for gold at £3 17s 6d per ounce and Ricardo suggested that they sell gold at £3 17s 9d. More importantly, they were instructed to watch the market price and increase issues when it “inclined to” £3 17s 6d “or under,” and to limit issues or withdraw “a small portion” when it inclined to £3 17s 9d “or more.” The endpoints therefore belong to the intervention regions: £3 17s 6d is expansionary and £3 17s 9d is contractionary. The new rule did not simply repeat the one in the earlier proposal. It narrowed the intervention band from £3 17s–£3 17s 10½d to £3 17s 6d–£3 17s 9d, transferred note issue to independent Commissioners, and gave them open-market operations as an additional instrument. But it retained the governing principle: the quantity of paper was to respond to its value relative to gold or the exchanges, not to the quantity of bullion held by the issuer.⁶

However, Mushet (1826, p. 139) noted that after July 1822, the Bank of England resolved to purchase gold at £3 17s 6d per ounce and warned that a quoted gold price below the Mint price was “no guide as to the actual value of the currency.” Ricardo (1824) was clearly aware of this practice and incorporated the same £3 17s 6d purchase price into the proposed operating rule: the Commissioners were to purchase standard gold bullion offered at that price while regulating their issues according to the price of gold bullion and the foreign exchanges. The lower boundary of

⁶ The 1816 proposal remains useful as a historical comparison, not as a competing characterization of Ricardo’s mature position. Ricardo retained its governing market-value principle in 1823 but materially altered the intervention band and the institutional mechanism. The descriptive mapping of the historical London gold quotation into the 1816 and 1823 bands is reported in the Appendix only to document the literal prices Ricardo specified; it is not used as the post-1822 empirical test.

Ricardo's band was therefore not simply an independently observed market price but, in part, an outcome of the monetary operating rule itself. Tooke (1826, p. 66) observed that as long as the Bank remained solvent and coin was freely obtainable for export, the market price of bullion could not rise materially above the Mint price; "the only test of excess, therefore, is the tendency to an efflux of the metals; in other words, the exchanges." Therefore, the Paris and Hamburg exchanges provide the observable market signal required to apply Ricardo's rule.

Bank practice recognized the same logic. Before the 1832 Bank Charter Committee, William Ward stated that the Bank should "keep in view the foreign Exchanges and the state of the bullion market" and should increase its notes "under a favourable exchange," because under a metallic circulation an inflow of gold would itself increase the currency (Great Britain 1832, Q. 2097–98).

Ricardo's reliance on the market price of gold and the foreign exchanges to regulate circulation should not be read as implying that he regarded convertibility as insufficient to prevent over-issue. Mill (1826) provides perhaps the clearest contemporary exposition of Ricardo's theory when refuting the hypothesis advanced by Tooke (1826) that even under convertibility a considerable interval could elapse between an additional issue of paper and the resulting export of gold, allowing the currency to depreciate.⁷ Mill explained that, under effective convertibility, additional paper displaced a corresponding quantity of gold as movements in the exchanges toward the gold export point rapidly induced arbitrage between London and Paris. He estimated that, since the cost of remitting gold to France was less than 1 percent, a depreciation of that magnitude would cause gold exports within a matter of days, and observed that exports could begin even before the full arbitrage margin had been reached. The intervention band in Ricardo's rule defined the range

⁷ There is an irony here since Tooke's 1826 argument anticipated the proposition later associated with the Currency School.

within which the currency could fluctuate without requiring adjustment and the boundaries at which bullion-market arbitrage called for expansion or contraction.

The Commissioners did not have to rely solely on bullion transactions to implement the rule. They could sell government securities and cancel the notes received, without reducing their gold stock; conversely, they could increase the circulation by purchasing securities with newly created paper. Ricardo believed that, by following his rule, the Commissioners “could never err.” However, the rule left room for discretion: it specified the direction of adjustment, but not its magnitude. At the upper boundary they were to limit issues or withdraw “a small portion” (Ricardo 1824, 26).

In modern terminology, what Ricardo proposed was a monetary-policy feedback rule. The issuing authority adjusted paper in response to observable market signals—the price of bullion and the foreign exchanges—and then observed the market response. Ricardo did not specify a numerical response coefficient. That omission prevents a defensible simulation of the counterfactual path, but it does not prevent an independent classification of each observed quotation according to the direction of adjustment implied by the rule.

$$\Delta N_t = f(P_t^g - P^*, E_t)$$

where N is note issue, P^g is the market price of gold, P^* denotes the relevant boundary of Ricardo’s gold-price band, and E is the foreign-exchange signal.⁸ In modern terminology Ricardo’s rule can be represented as a price-based feedback reaction function: market-value signals generated a direction for changes in note issue.

For the purposes of the analysis, each historical observation is treated as independent. Ricardo’s policy prescription at time t is evaluated conditional on the market state observed at t . Because that

⁸ The notation is a modern analytical representation, not a formula proposed by Ricardo. Its purpose is to make explicit that note issue was endogenous to market-value signals rather than mechanically tied to the stock of bullion.

counterfactual prescription was not implemented, it had no effect on the historical market variable observed at $t+1$. The exercise therefore yields a sequence of independent contemporaneous policy prescriptions, not a simulated counterfactual path.

3.2. Peel's Issuance Ceiling

The intellectual basis of the Peel Act was the Currency Principle as set out by Loyd (1837, p.50): “The sole duty to be performed in regulating a paper-currency is to make its amount vary, as the amount of a currency exclusively metallic would vary under the same circumstances.” It was assumed, incorrectly according to Fullarton (1845, pp.69-81), that under a metallic standard, an external drain of £1 million in gold would reduce the domestic monetary circulation by £1 million. If banknotes could remain in circulation while gold was leaving the country, a mixed currency would fail to reproduce that adjustment. Convertibility alone was therefore insufficient. The note issue itself had to contract and expand *pari passu* with the metallic reserve. This is the conceptual innovation Mill and Tooke were referring to.

There was a precedent. Following the Crisis of 1825, the Bank of England adopted what became known as the Palmer rule. Its purpose was to maintain the Bank's securities approximately constant, so that changes in its liabilities would reflect changes in its bullion holdings.⁹ The Currency School subsequently converted this approach into a more rigid theoretical proposition. Peel's Act gave that principle legal force.

⁹ The Palmer rule, adopted by the Bank of England after 1825, sought to maintain the amount of securities approximately constant, allowing changes in bullion to produce corresponding changes in the Bank's monetary liabilities. It therefore represented an intermediate step toward the Currency Principle: unlike Ricardo's gold-price rule, it made the quantity of bullion the operative variable, although it applied to the Bank's overall liabilities rather than mechanically to its note issue.

The Peel Act separated the Bank of England into an Issue Department and a Banking Department. The Issue Department received £14 million in securities, including the government debt to the Bank, together with the Bank's gold coin and bullion. Beyond this amount, additional notes could only be issued against gold coin or bullion received by the Issue Department. The Act therefore did not impose a 100 percent metallic reserve against the entire note circulation but at the margin above the fiduciary issue of £14 million.

When observed circulation lay below the ceiling, the Peel Act left room for discretion; when it exceeded it, contraction was required. This is the relevant distinction for the empirical exercise below.

$$N_t \leq £14m + G_t$$

where N is the note issue and G is bullion. The Currency Principle sought a pound-for-pound relation at the margin, but the statute did not constitute a symmetric reaction function. A loss of bullion reduced the maximum permissible issue; it did not by itself require an immediate contraction if the Bank remained below the ceiling. This distinction is essential when comparing Peel with Ricardo.

The Banking Department could meet withdrawals or expand discounts only with notes it already held or could obtain; it could not compel the Issue Department to create additional unbacked notes. The separation was deliberate: banking decisions could not override the Currency Principle, so an increased demand for liquidity did not itself authorize an increase in aggregate note issue.

3.3. Money Demand and Policy Equivalence

The difference between the two regimes is deeper than price versus quantity. Ricardo's rule accommodated changes in money demand: because the market value of money reflects both supply

and demand, note issue could rise when money demand increased without violating the rule, provided the metallic standard was maintained. No corresponding increase in bullion reserves was required.

The Peel Act did not. Once the fiduciary issue was exhausted, additional aggregate note issue required additional bullion. Notes already held by the Banking Department could meet withdrawals or support lending, but an increase in money demand did not authorize additional aggregate note creation.

The empirical test follows directly: at each independently observed historical state, what policy does Ricardo's rule prescribe, and does the Peel constraint leave discretion or require contraction? The exercise compares contemporaneous policy prescriptions; it does not construct a dynamic counterfactual path.

4. Empirical Strategy and Results

The empirical analysis covers April 1821 through July 1844. Monthly Bank of England note circulation and bullion holdings are taken from Gayer, Rostow, and Schwartz (1953), with the May 1823 bullion observation corrected using figures from the 1832 parliamentary return. Market data come from the Center for Financial Stability's Historical Financial Statistics: Daily and Monthly Market Rates, which are based on *The Course of the Exchange* and the data assembled by Boyer-Xambeu, Deleplace, and Gillard (2010). The principal external-market series is the London sight rate on Paris. For 1821–1827 a reconstructed Hamburg sight rate provides an additional check; the contemporary London-on-Hamburg two-month quotation reported by Mushet from Lloyd's List is used as an independent historical corroboration of direction, not as a sight parity because it embeds a usance component. Contemporaneous Paris and Hamburg metal prices are used to construct commercial metallic parities.

4.1. Data and Implementation of Ricardo's Rule

The rule used for the test is the one in Ricardo (1824). Because after July 1822 the Bank of England's standing purchase price determined a lower boundary for the observed London quotation—a mechanism Ricardo himself incorporated into his 1823 Plan—the post-July 1822 London gold price cannot be treated as an independent market signal. The rule is therefore implemented using the foreign exchanges. Quotations on Paris and, where available, Hamburg are compared with contemporaneous commercial metallic parities following Boyer-Xambeu, Deleplace, and Gillard (1994). Because freight, insurance, brokerage, interest, and other arbitrage costs were not invariant, the paper reports symmetric sensitivity bands of 0.5, 1.0, and 1.5 percent rather than imposing a single gold point. A quotation above the upper band calls for expansion under Ricardo's rule; one below the lower band calls for contraction; observations inside the band imply no forced adjustment. The London gold series is retained only as a descriptive mapping of Ricardo's stated intervention prices.

Exceptional specie demands could also move the exchanges independently of domestic monetary conditions, as Rothschild emphasized before the 1832 Committee in connection with wars and foreign-government payments (Great Britain 1832, Q. 4808–12). The test identifies the direction of metallic arbitrage implied by the exchange, not the cause of every exchange movement.

The Peel Act counterfactual is simpler. For each month, maximum note issue is set equal to £14 million plus bullion. If observed notes are below that amount, the constraint is classified as nonbinding and Peel leaves discretion. If observed notes exceed it, the counterfactual Peel Act requires contraction by at least the excess. The exercise therefore does not infer contraction merely from a fall in bullion. It asks whether the fall would have made the statutory constraint bind at the observed level of note circulation.

The comparison is static, state-contingent, and observation-by-observation. Ricardo's policy prescription at time t is evaluated conditional on the market state observed at t . Because that counterfactual prescription was not implemented historically, it is not allowed to affect the market state observed at $t+1$. The exercise therefore yields a sequence of independent contemporaneous policy prescriptions, not a simulated counterfactual path.

The comparison is static, state-contingent, and observation-by-observation. For the monthly exercise, the last available exchange quotation in each month is paired with the monthly Bank balance-sheet observation; the higher-frequency exercise classifies each surviving quotation separately. In neither case is a counterfactual policy response carried forward from one observation to the next. Ricardo's prescription at time t is evaluated conditional on the historical market state observed at t , and any counterfactual intervention at t is not allowed to affect the historical variables observed at $t+1$. The analysis consequently compares contemporaneous policy prescriptions only.¹⁰

4.2. Results and Policy Implications

The empirical comparison covers 280 monthly observations from April 1821 through July 1844. Because the post-1822 London gold quotation is policy-conditioned, Ricardo's rule is implemented with the foreign exchanges. The familiar 216/63/1 mapping of the published London gold quotation into Ricardo's 1823 band is retained only in the Appendix as a descriptive benchmark. This identification choice is consequential: mechanically applying Ricardo's 1823 gold-price band would classify 16 of the 26 Peel-binding months at the upper intervention

¹⁰ A dynamic counterfactual cannot be constructed because, after the first intervention, subsequent policy decisions would have to respond to simulated rather than observed market signals, rendering the conclusions of the exercise meaningless.

boundary. The foreign-exchange test is used precisely because the post-July 1822 London gold quotation no longer provided a signal.

The Peel Act ceiling is nonbinding in 254 months, or 90.7 percent of the sample, and requires contraction in 26, concentrated in four episodes: July 1825–August 1826, April–May and July–August 1829, January–February and April 1837, and May and July–October 1839. Therefore the direct test of policy equivalence is what Ricardo’s rule prescribes in those 26 months.

At a 0.5 percent transaction-cost band, Ricardo’s rule calls for expansion in 193 observations, no forced action in 86, and contraction in one. At a 1.0 percent band the corresponding counts are 94, 186, and zero; at 1.5 percent they are 23, 257, and zero. More important, among the 26 months in which Peel requires contraction, Ricardo’s rule never calls for contraction under any of the three bands. At 0.5 percent, Ricardo calls for expansion in 15 of the 26 observations and no forced action in 11; at 1.0 percent the split is 8 and 18; at 1.5 percent it is 3 and 23. The exact number of expansionary observations is therefore sensitive to arbitrage costs, but the absence of a contractionary Ricardian prescription when Peel binds is not. Thus, whenever the Peel Act requires contraction, Ricardo’s rule never does so under any of the three transaction-cost assumptions.¹¹

¹¹ Hamburg provides an additional quotation-level check through 1827, particularly for the crisis of 1825. It is not used in the full-sample monthly classification, which is based on Paris. The CFS sight series can be evaluated directly against a contemporaneous gold-equivalent commercial parity. On a monthly last-quotation convention, Hamburg is contractionary in some Peel-binding months of 1825, so it does not independently reproduce the full-sample Paris result. For December 1825, however, the quotation-level evidence is especially informative: both Paris and Hamburg are above the 1 percent band on 16 December. Mushet’s appendix, drawn from Lloyd’s List, reports the conventional London-on-Hamburg two-month course and independently confirms the sharp favorable movement in mid-December. Because a long-usance quotation contains an interest component, it is used as corroboration rather than inserted mechanically into the sight gold-point calculation.

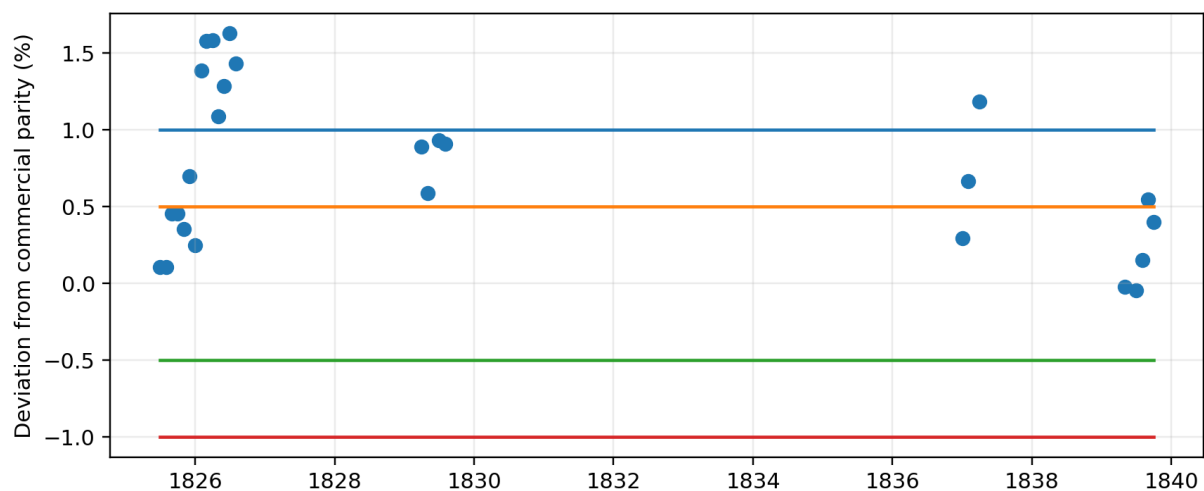
Table 1. Ricardo's monthly policy signal and Peel constraint, April 1821–July 1844

Transaction-cost band	Ricardo: Expansion	Ricardo: No action	Ricardo: Contraction	Peel-binding months: Expansion / No action / Contraction
0.5%	193	86	1	15 / 11 / 0
1.0%	94	186	0	8 / 18 / 0
1.5%	23	257	0	3 / 23 / 0

Note: Paris classifications use the last available London sight quotation on Paris in each month relative to contemporaneous commercial metallic parity. The bands are symmetric sensitivity assumptions, not claims that transaction costs were constant at those exact values. 'Peel-binding' observations are months in which actual notes exceed the counterfactual ceiling of £14 million plus bullion. The London gold-price classification is excluded from this table because the Bank's own purchase policy makes it non-independent after July 1822.

The higher-frequency evidence is used where timing matters most. Each Paris and Hamburg quotation is treated independently. This allows us to examine the crisis episodes without pretending that the historical sequence is the counterfactual path that Ricardo's rule would have generated. The spreadsheet appendix accompanying the paper reports both the monthly simulation and the quotation-level series, including sensitivity to alternative transaction-cost bands and the descriptive London gold quotation for reference.

Figure 1. Paris exchange deviation from commercial metallic parity in Peel-binding months, 1821–1844



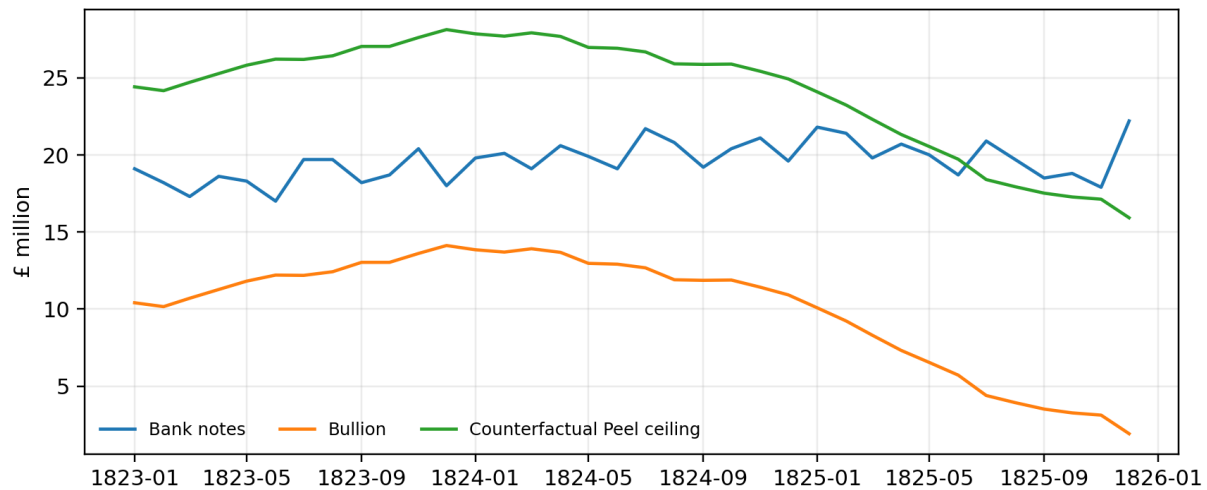
Note: Horizontal lines mark the ± 0.5 and ± 1.0 percent sensitivity bands.

4.3. The Crisis of 1825

The speculative boom began in spring 1823, while yields declined and remained unusually low into 1824 (Neal 1998). Bank bullion rose from £10.412 million in January 1823 to £14.124 million in December and remained close to that level through March 1824. The Peel Act rule therefore accommodated the monetary expansion during 1823. The speculative expansion accelerated during 1824 and reached its greatest intensity in the first months of 1825. Mill (1826) reported adverse exchanges by July 1824. By then, however, Bank bullion had already begun to decline, falling from £13.914 million in March 1824 to £12.678 million in July, £11.887 million in October, and £10.924 million in December. The decline accelerated in 1825, with bullion falling to £8.308 million in March, £5.720 million in June, and £1.923 million in December.

The decline in bullion beginning in 1824 did not immediately make the counterfactual Peel Act limit binding. In March 1824, for example, bullion of £13.914 million implied a maximum issue of £27.914 million against observed notes of £19.1 million; in July the corresponding figures were £26.678 million and £21.7 million. The Peel Act therefore still left substantial headroom. At the same time, contemporaries were already reading deterioration in the foreign exchanges as the relevant warning. Tooke (1826) dated an evident continental gold efflux to July 1824, and Mushet (1826) likewise traced the continuing export of gold to the state of the exchanges rather than to the absolute London bullion quotation.

Figure 2. Bank notes, bullion, and the counterfactual Peel ceiling, 1823–1825



The published London gold price rose toward the Mint price during 1824–25 but cannot be used as an independent trigger after July 1822. Ricardo’s rule must therefore be read through the foreign exchanges, which show both the deterioration preceding the crisis and the reversal in late 1825.

December 1825 provides the sharpest observation-level contrast. The published London gold quotation fell to 77s 6d and remained there through the panic, but as Mushet’s pointed out, that had been the Bank’s buying price since July 1822. The foreign exchanges provide an independent signal. During December sterling strengthened sharply in both Paris and Hamburg. Relative to contemporaneous commercial metallic parities, the Paris sight rate moved from roughly 0.35 percent above parity on 2 December to about 1.60 percent above parity on 16 December; the reconstructed Hamburg sight rate was about 1.44 percent above its gold-equivalent parity on 16 December. Mushet’s independent Lloyd’s List table records the conventional London-on-Hamburg two-month quotation rising from 37.2 on 2 December to 38.0 on 16 December, corroborating the direction of the move. Under a 1 percent sight-market sensitivity band, both Paris and Hamburg independently indicate conditions favorable to metallic inflow into London on 16 December.

By then, the monthly average of bullion had fallen to £1.923 million while notes stood at £22.2 million. Using the monthly-average figures, a counterfactual Peel Act ceiling of £15.923 million would therefore have required an average contraction of £6.277 million, or 28.3 percent of average note circulation, just as bank failures and the collapse of private credit produced an extraordinary demand for liquidity. The constraint became considerably tighter within the month: weekly returns for 24 December put note circulation at about £25.6 million and bullion at about £1.03 million, implying a ceiling of roughly £15.03 million and a required contraction of about £10.6 million—more than 40 percent of note circulation (Tooke 1826; Great Britain 1832). Ricardo's rule, by contrast, called for expansion as both Paris and Hamburg indicated conditions favorable to metallic inflow into London.

In this instance, Ricardo's rule was consistent with the Bank's emergency provision of liquidity during the panic, whereas the Peel rule would have required a drastic contraction in circulation.

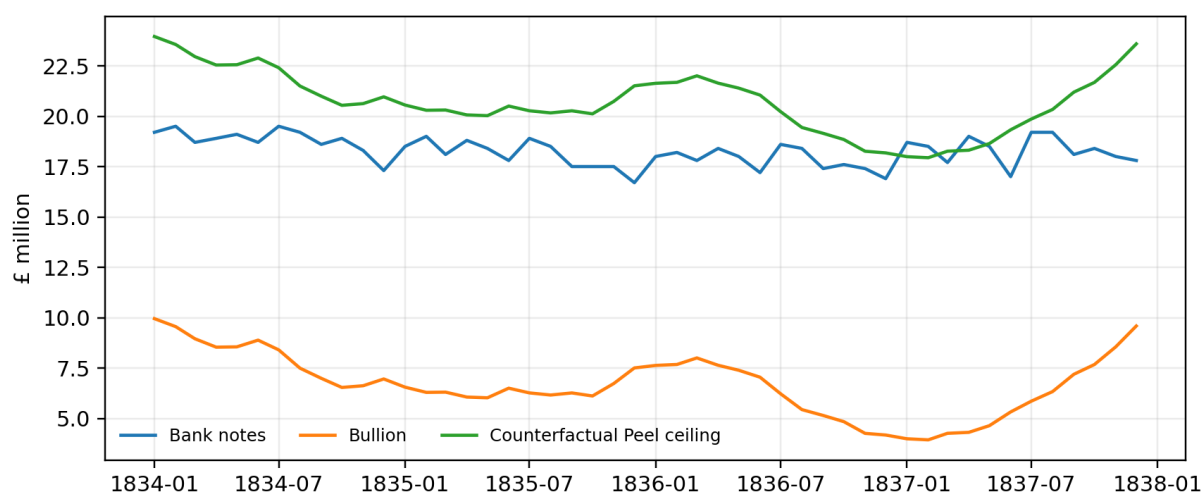
4.4. The Crisis of 1837

The 1837 episode provides a second test. The Bank was already attempting to follow the Palmer Rule, although not systematically. Hamburg sight observations end in 1827, so Ricardo's rule is evaluated with the Paris exchanges. During the bullion decline of 1834–35 the Peel ceiling remained nonbinding. In June 1835, bullion of £6.502 million implied a maximum issue of £20.502 million against observed notes of £17.8 million, while the last Paris quotation stood about 0.79 percent above commercial parity, inside the 1 percent band.

The Peel Act constraint became binding in January, February, and April 1837. The last Paris quotation in January was about 0.30 percent above commercial parity and in February about 0.67 percent above; both lie inside a 1 percent band and therefore imply no forced directional action. In April the last quotation was about 1.18 percent above parity, which crosses the 1 percent upper

band and indicates conditions favorable to metallic inflow. At a wider 1.5 percent band all three observations remain inside the band. Thus, once the contaminated London-gold signal is removed, 1837 is not evidence of contemporaneous agreement between Ricardo and Peel on contraction.

Figure 3. Bank notes, bullion, and the counterfactual Peel ceiling, 1834–1837



These results again reject the null hypothesis: in January and February 1837 Peel requires contraction while Ricardo's rule calls for no forced adjustment at the 1 percent band; in April Peel still binds while Ricardo calls for expansion.

5. Conclusion

The Peel Act has often been presented as the culmination of Ricardo's monetary principles. The counterfactual analysis presented in this paper provides further evidence that it was not. This result is consistent with the reinterpretation advanced by Arnon (1987) and Diatkine (1994), and developed further by Deleplace (2008, 2020). Their analyses emphasized that Ricardo's final monetary rule differed fundamentally from the automatic reserve-based mechanism later associated with the Currency School. The evidence presented here shows that this difference was

not merely institutional or doctrinal: the two regimes generated different policy prescriptions under the same historical conditions.

Between April 1821 and July 1844, the Peel Act is nonbinding in 254 of 280 monthly observations and requires contraction in 26. In none of those 26 states does Ricardo's rule call for contraction under transaction-cost bands of 0.5, 1.0, or 1.5 percent. At the 1 percent band, it calls for expansion in eight and no forced adjustment in eighteen. The assumed arbitrage band affects how many Peel Act binding observations are classified as Ricardian expansions rather than no-action cases. It does not affect the central result: whenever the Peel Act requires contraction, Ricardo's rule never does. December 1825 is the clearest case: using monthly averages, Ricardo's rule called for expansion while the Peel Act would have required a contraction of 28.3 percent of note circulation; the implied contraction was substantially larger at the height of the panic later in the month. A similar divergence appears during the 1837 crisis: when the Peel Act binds in January and February, Ricardo calls for no forced adjustment at the 1 percent band, while in April Ricardo calls for expansion.

The non-equivalence of the policy prescriptions generated by the two regimes is structural. Ricardo's rule made the quantity of paper endogenous to market-value feedback; the Peel Act forced an exogenous and precise contraction whenever its ceiling was exceeded. The question is not whether one rule was superior, but whether the Peel Act was Ricardian in its policy implications. It was not.

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Appendix A. Data and Coding

The monthly dataset covers April 1821 through July 1844 (280 observations). Bank of England note circulation and bullion are from Gayer, Rostow, and Schwartz (1953), with the May 1823 bullion observation corrected using the 1832 parliamentary return. Market data are from the Center for Financial Stability Historical Financial Statistics, drawing on *The Course of the Exchange* and Boyer-Xambeu, Deleplace, and Gillard. The principal external-market series is the London sight rate on Paris; a Hamburg sight series is available through December 1827. The monthly FX simulation uses the last available quotation in each month. The higher-frequency simulation treats every surviving quotation as an independent observation.

London gold diagnostic: Ricardo's 1823 transaction points are 77.50 and 77.75 shillings per ounce; the corresponding 1816 points are 77.00 and 77.875. Mechanically mapping the published monthly London quotation into those bands yields the descriptive counts reported below. These counts are not used to identify Ricardo's policy prescription after July 1822. Mushet (1826) reports that the Bank then adopted 77s 6d as its purchase price and explicitly states that a quoted gold price below the Mint price was not a guide to the actual value of the currency. Tooke (1826) similarly argues that after resumption the external test is the exchanges.

Peel: counterfactual maximum note issue equals £14 million plus bullion. If observed notes are below or equal to this amount, the statutory constraint is nonbinding (Discretion); if observed notes exceed it, the observation is coded Contract. The constraint binds in 26 of 280 months and is nonbinding in 254.

Foreign-exchange simulation: Paris and Hamburg sight quotations are evaluated relative to contemporaneous commercial metallic parities derived from market metal prices. The workbook

reports symmetric transaction-cost bands of 0.5, 1.0, and 1.5 percent. Quotations above the upper band are coded Expansion (conditions favorable to metallic inflow into London); quotations below the lower band are coded Contraction; observations inside the band are coded No forced action. Monthly classifications use the last available quotation in each month; quotation-level classifications use every quotation independently. The contemporary London-on-Hamburg two-month series reported by Mushet from Lloyd's List is included as a directional validation series but not treated as a sight rate.

Table A1. Descriptive London-gold mapping and Peel constraint

Classification	Full sample	1823–1825	1834–1837
Observations	280	36	48
Ricardo 1823: Upper / Lower / Interior	216 / 63 / 1	12 / 23 / 1	48 / 0 / 0
Ricardo 1816: Upper / Lower / Interior	61 / 0 / 219	7 / 0 / 29	5 / 0 / 43
Peel: Discretion / Contract	254 / 26	30 / 6	45 / 3
Peel contract & Ricardo Upper	16	4	3
Peel contract & Ricardo Lower	9	1	0
Peel contract & Ricardo Interior	1	1	0

Table A2. Paris and Hamburg exchange signals, December 1825

Date	Paris F/£	Paris deviation	Hamburg sight sch./£	Hamburg deviation
2 Dec	25.25	+0.35%	35.708	+1.58%
6 Dec	25.30	+0.55%	35.667	+1.39%
9 Dec	25.35	+0.75%	35.667	+0.88%
13 Dec	25.40	+1.00%	35.750	+0.97%
16 Dec	25.55	+1.60%	35.917	+1.44%
20 Dec	25.50	+1.40%	35.667	+0.81%
23 Dec	25.50	+0.94%	34.750	−0.72%
27 Dec	25.50	+1.10%	34.750	−0.72%
30 Dec	25.40	+0.70%	34.750	−0.72%

Note: Paris and Hamburg deviations are from contemporaneous sight commercial gold-equivalent parities computed from the CFS metal-price series. Positive values indicate sterling above commercial parity and increasingly favorable conditions for metallic inflow into London. Exact import points depend on transaction costs; the text therefore reports sensitivity rather than treating one band as historically exact. Mushet's Lloyd's List Hamburg quotations are two-month usance rates and are used only as an independent directional check.