

DISCUSSION – DISKUZE

The limits of models in the debate on Great Moravian centres: A view from the east

Limity modelů v debatě o velkomoravských centrech:
Pohled z východu

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The paper examines the limits of existing models used to interpret the functioning of Great Moravian centres through the case study of Bojná-Valy in Western Slovakia. While recent debate has been structured around Jiří Macháček's triad of models (agrarian hinterland, autarky, and local market) critically revised by Michal Hlavica, this study argues that such frameworks are insufficient when applied to non-standard sites. Bojná-Valy, lacking a clear settlement hinterland and displaying strong military and logistical characteristics, cannot be fully explained by any of these models. Instead, it is interpreted as a specialised control and provisioning node, combining institutional redistribution, strategic resource management, and limited, segmentary exchange. The case highlights the coexistence of multiple economic mechanisms and underscores the need to distinguish between market exchange as a systemic integrative force and as a secondary by-product of logistics and control. More broadly, the paper suggests that the Great Moravian system was hierarchical, networked, and functionally differentiated, requiring more flexible interpretative models beyond rigid dichotomies.

Early Middle Ages – Great Moravia – economy – central places – market

Článek se zabývá limity stávajících modelů používaných k interpretaci fungování velkomoravských center na příkladu lokality Bojná-Valy na západním Slovensku. Zatímco dosavadní diskuse se strukturovala kolem trojice modelů Jiřího Macháčka (agrární zázemí, autarkie a lokální trh), kriticky revidovaných Michalem Hlavicí, tato studie ukazuje, že při aplikaci na nestandardní lokality jsou takové interpretační rámce nedostatečné. Na Bojnou-Valy, postrádající jednoznačně identifikovatelné sídelní zázemí a vykazující výrazné vojenské a logistické charakteristiky, nelze plně aplikovat žádný z těchto modelů. Lokalita je proto interpretována jako specializovaný uzel kontroly a zásobování, kombinující institucionální redistribuci, strategické řízení zdrojů a omezenou segmentární směnu. Tento případ poukazuje na souběžnou existenci různých ekonomických mechanismů a zdůrazňuje potřebu rozlišovat mezi tržní směnou jako systémovou integrační silou a tržní směnou jako sekundárním produktem logistiky a kontroly. V obecnější rovině příspěvek naznačuje, že velkomoravský systém byl hierarchický, síťově propojený a funkčně diferencovaný, a vyžaduje proto flexibilnější interpretační modely překračující rigidní dichotomie.

raný středověk – Velká Morava – ekonomika – centrální místa – trh

Introduction

Research on Great Moravian centres has traditionally employed hierarchical centre–hinterland interpretations. The current debate, however, is shifting from what these centres were to how they worked, how they were sustained, and how they interacted with their settlement hinterlands (Dresler 2016; Hladík 2020; Hladík et al. 2022; Hlavica 2023). At the heart of this debate is the question of whether centre–hinterland relations were struc-

tured primarily through redistribution and the politically coordinated or coercive mobilisation of resources, or whether market-oriented exchange played a more significant role.

A major recent contribution is that of *Macháček (2026b)*, who proposed three models of Great Moravian central agglomerations: (I) a central place, understood functionally as a space structuring particular spatial, political, or economic relationships, with an agrarian hinterland, (II) an autarkic model, and (III) a local agglomeration market. However, *Hlavica (2026)* has argued that this framework is overly rigid, since economic mechanisms were likely regionally variable, diachronically dynamic, and functionally mixed. Macháček presents his triad as a set of largely mutually exclusive options. This raises a definitional issue: he understands agglomerations as centres performing ‘all major central functions’ (political, administrative, economic, military, cult, etc.). Such a definition privileges the centre–hinterland model and risks overlooking sites that exhibit only partial or non-standard forms of centrality.

This article starts from the premise that the limits of both approaches are most visible not in the best-known centres of Southern Moravia, but in borderline cases that do not fit neatly into existing models. One such example is the hillfort complex at Bojná in Western Slovakia, particularly Bojná-Valy hillfort. Its location, settlement structure, chronology, and material record point to a centre of high political and economic importance (central place), yet one operating according to a logic different from that of Great Moravian central agglomerations with a defined agrarian hinterland. Bojná is used here not as a representative example of Great Moravian centres, but as a boundary case testing the transferability and limits of models derived primarily from the Moravian core.

This article aims to determine what type of hub Bojná-Valy represents and to assess how this case challenges existing models of Great Moravian central places. Was it a centre of power, a garrison, a distribution node, or a distinct category of site? I situate Bojná within the Macháček–Hlavica debate and identify the limits of both approaches when confronted with evidence from the eastern periphery of Great Moravia. I also propose an interpretative framework that better captures the role of Bojná within the broader centre–hinterland system.

Models, assumptions, and tensions

Within the framework of the Central European model of early states (e.g. *Macháček 2008; Štefan 2014; Kalhous 2022*), historiography has generally explained the functioning of the Great Moravian economy in terms of top-down exploitation of rural communities by hillfort elites. This system is thought to have operated through enforced tribute, occasional punitive expeditions, and possibly forms of service organisation, which may have subordinated otherwise free populations. In the interpretation of *Macháček (2026b)*, this ‘traditional model’ remains the most empirically grounded and has not been convincingly falsified. Accordingly, Great Moravian central agglomerations are seen as nutritionally dependent on their rural hinterlands, with goods transferred through redistribution, obligations, and elite control. This leaves little room for a market economy. Yet the absence of clear evidence for service organisation raises the question of how such transfers were secured – whether through coercion alone.

Macháček revisits this issue by restoring agency to ‘common people’, building on ideas already proposed by Štefan (2011). He suggests that centre–hinterland relations need not be interpreted solely in terms of coercion, but may also reflect voluntary cooperation, including collective defence and reciprocal exchange. In this view, central agglomerations developed through negotiation between farmers and specialised groups (craftsmen, merchants, warriors), with some degree of population mobility between village and centre. *Suburbium* zones may have functioned as areas of fluid interaction, supported by the distribution of military finds. Participation in warfare could thus have been conditional rather than a sign of permanent subordination. While compelling, this model does not resolve whether transfers were coercive, negotiated, or market-based. Progress requires clearer definitions and testable archaeological indicators, such as storage concentration, standardisation tools, provenance patterns, and settlement–provisioning relationships, as well as a more precise understanding of what could actually be negotiated.

Macháček presents three models: (1) agrarian hinterland, (2) autarky, and (3) local market as largely exclusive alternatives, ultimately rejecting the market model in favour of coercion or negotiated transfer. Hlavica (2026) challenges this binary framing, arguing that early medieval systems likely combined multiple mechanisms. He proposes a diachronic and regionally differentiated approach, in which production, redistribution, and exchange coexist and vary over time and space, using the elements of the Central Place Theory (CPT) and network approaches (Hohenberg – Lees 1985). The classical normative model of central places was formulated by Christaller (1966) and further developed by Evans (1980). In this approach, a central place and its surrounding area form a functional whole regulated by a dominant core, providing political, administrative, defensive, economic, cultural, and religious functions for the surrounding population. Although CPT has been criticised as overly schematic and insufficiently sensitive to geographical diversity (Bird 1973), it broadly corresponds to early medieval realities. Its main limitation lies in detailed application, which has led to the development of alternative, non-exclusive models (Siemianowska 2014). In network approaches, regions characterised by a generally higher level of socio-economic development (cores) generate impulses of demand directed towards the peripheries, understood as marginal zones subject to interaction with the core area. A distinctive position between them may be occupied by a centre located at the outer edge or forefield of one of these zones, where it performs the function of a gateway.

The debate can be understood in Polanyian terms: whether the economy was primarily ‘embedded’ in social and political institutions or whether autonomous market-like exchange also played a role. Macháček seeks a dominant systemic mechanism, emphasising redistribution and dependence on the hinterland. Hlavica, by contrast, focuses on the empirical mechanics of circulation and treats models as overlapping layers rather than alternatives. This flexibility, however, risks weakening falsifiability, as diverse patterns can be interpreted within a single framework. The disagreement also reflects different epistemological positions. Macháček stresses the ambiguity of archaeological indicators, while Hlavica relies on distribution patterns of everyday goods to reconstruct a ‘system of markets’. For Macháček, the functioning of centres is best explained through politically coordinated mobilisation of resources within a hierarchical system, with limited commercialisation. The market, in a strong sense, is not a necessary condition for system integration. Hlavica responds that this framing excludes the possibility that market mechanisms could coexist with redistribution. He argues that elite control over strategic goods does not preclude the

exchange of everyday items and proposes a more complex model combining ‘solar’ local markets with ‘dendritic’ controlled distribution networks. More broadly, such a bottom-up perspective also allows for economic responses initiated by rural producers themselves when centres created concentrated and predictable demand.

Underlying this dispute is a difference in views of political organisation: Macháček emphasises hierarchy and control, while Hlavica highlights decentralisation, polycentricity, and cooptation. The key issue is not simply the presence of markets, but how they are defined – either narrowly as formal institutions or broadly as one mode of economic integration among others. From the perspective of rural producers, these distinctions may have been less significant than their dependence on nearby centres.

Both scholars agree on the importance of pottery distribution for studying internal exchange. However, its interpretative value remains limited. At most, it indicates consumer circles (Štefan 2014, 161–162) rather than market freedom. Given the low cost and wide availability of pottery, long-distance distribution would have required specific conditions.

Both authors base their models on well-studied proto-urban centres in southern Moravia. These sites represent exceptional, almost ideal examples of central agglomerations. Yet this very representativeness may bias interpretation. Focusing on such cases risks overlooking the diversity of the wider system, including less typical centres and peripheral regions. It is therefore plausible that the core areas of Great Moravia functioned differently from its margins. A general model must take this variation into account.

Bojná-Valy as a borderline case

The hillfort of Bojná-Valy in Western Slovakia, together with its wider surroundings, has long been interpreted as a site of considerable political, economic, and military importance. From the beginning of research, its chronology has been central to discussions of its function. Initially, Bojná was regarded as a centre of power associated with pre-Great Moravian elites, particularly the presumed Principality of Nitra under Pribina. Subsequent excavations and new chronological data, however, showed that the individual components of the complex were not strictly contemporaneous, and that the Valy hillfort itself is considerably later, functioning mainly towards the end of the 9th century (Henning – Ruttkay 2011). Bojná-Valy and its surroundings were therefore later interpreted as a settlement–fortification agglomeration operating broadly between the 8th and 9th/10th centuries, focused on metallurgy, craft production, and trade (Pieta 2017).

This interpretation, however, leaves several issues unresolved: the absence of an immediate settlement hinterland; the site’s difficult location in a mountainous environment; the logistical problems of provisioning; the limited agricultural potential of the surrounding area; the predominance of weapons, equestrian equipment, and metallurgical tools; the near absence of personal ornaments; the lack of dense built-up occupation; and the absence of a substantial cemetery contemporary with the main hillfort. On the basis of these observations, derived from nearly two decades of fieldwork, I proposed interpreting Bojná-Valy as a form of spatial organisation distinct from a typical settlement agglomeration and displaying features comparable to a garrison-type arrangement (Robak 2021, 62), later conceptualised as a *crew fort*.

If compared with Macháček's definition of Great Moravian agglomerations, Bojná fulfils it only partially. Recent dendrochronological and radiocarbon studies suggest that the wider Bojná complex functioned continuously from at least the mid-7th to the mid-10th century (Robak – Pieta 2026), but its individual hillforts were not strictly contemporaneous, even if their chronologies may have overlapped. Settlement activity at Bojná-Valy can be dated from approximately the mid-9th century to the first half of the 10th century (after 908 AD). Its main phase falls in the 890s, when a substantial fortress was constructed on the Valy hill. Although traces of an earlier rampart are present, it remains unclear whether they belong to an earlier settlement phase or merely to a construction phase. Chronologically, Bojná-Valy corresponds closely to Břeclav-Pohansko (Dresler *et al.* 2010; Macháček 2026b, fig. 5), Mikulčice (Poláček – Hladík 2014; Rybníček *et al.* 2014; Barta *et al.* 2014; Hladík *et al.* 2022, 111–112, 133, 165–169), and the Staré Město complex (Galuška *et al.* 2018), with the caveat that it may have remained in use somewhat longer.

Spatially, however, Bojná-Valy differs markedly from these centres. The hillfort covers approximately 12 ha and occupies the flat summit of a narrow ridge at around 420 m above sea level. Apart from the inhabited and fortified western *suburbium* and faint traces of early medieval activity in the forefield, the site lacks a clearly developed settlement hinterland. No open settlements have been identified on the surrounding elevations, which were poorly suited to sustained colonisation and agriculture because of steep slopes and limited soil fertility. The nearest traces of open settlement occur approximately 5 km away, while the agricultural zone that could theoretically have supported the stronghold lay further away, on the more fertile terrace of the Nitra River, roughly 7–10 km from the site. This makes food self-sufficiency unlikely and indicates the absence of an 'inner settlement ring' (*Umland*), unless such a zone is reduced to the western *suburbium* itself. The lack of a cemetery within or near the hillfort strengthens the impression that there was no stable, immediate settlement base; the nearest Great Moravian period necropolis is known from the area of Závada, several kilometres away (Bialeková 1982; Robak 2018).

The location of Bojná-Valy therefore complicates its interpretation as a 'classical' settlement centre. Great Moravian agglomerations are usually situated in accessible wide river valleys, where open settlement could develop, and a dense *Umland* could emerge. Pobeďim and Nitra, surrounded by settlements and cemeteries, better fit this pattern. Bojná, by contrast, may have functioned as a prominent control point and symbolic focal site within the middle Nitra valley, even if it was not a central place in the agglomerative or geometrical sense. The longer tradition of using this landscape as a focal area for communities should also be taken into account (Robak *in press*; Robak – Pieta 2026).

The internal spatial organisation of Bojná-Valy is clearly structured but unusual (Robak 2021, 48–50). Archaeological excavations reveal distinct zones: residential areas with nearly identical square semi-sunken dwellings arranged along the axis of the hillfort; storage pits; a production zone with slag concentrations and pits containing fragments of iron objects; and an area associated with food preparation, including roasting plates and a furnace. Yet there is no evidence of sacral or elite residential buildings, internal divisions such as palisades, or organisation into larger household units. The site appears to have functioned efficiently and intensively, but not as a typical settlement. It suggests periodic, perhaps prolonged, occupation by people who arrived and departed without forming a stable community reflected in a funerary landscape.

This impression is reinforced by the material assemblage. The finds are dominated by weapons and equestrian equipment, while women and children are only weakly represented, mainly through a small number of ornaments. It is therefore difficult to avoid the hypothesis that Valy served primarily as a place for stationing and servicing a military retinue, whose members may have rotated. The hillfort also appears to have been abandoned suddenly but not destroyed internally: vessels remained on ovens, sets of metal objects were left inside dwellings, and there is no clear destruction layer or evidence of burnt houses. The massive fortifications, constructed with advanced and costly techniques, including dry-stone walling and auxiliary defensive lines, further support a predominantly military interpretation.

Material culture also suggests strong dependence on external supply. Grain may have arrived already threshed or partly processed, and the absence of chaff in soil samples is consistent with logistical provisioning (Mihalyiová 2017). The large number of agricultural tools might seem to challenge this view, but many derive from iron hoards or unstratified metal-detector finds, whose status as disturbed deposits remains unresolved (Boržová *et al.* 2020, 7, 20, 26, 32, 53–56). They cannot therefore be treated as direct evidence for permanent farmers or routine agricultural work within the stronghold (cf. Hlavica 2026, 134). Many tools are also damaged. Given the absence of household organisation and the distance to arable land, the scenario of a resident farming community is weak. Unlike Břeclav-Pohansko, where the autarkic model proposed by Dresler (2016) could at least rely on suitable land immediately beyond the fortifications, Bojná offered no such conditions.

Nor does Bojná provide clear evidence for highly specialised craft production aimed at goods such as ornaments. Some archaeologically visible craft activity, especially iron-working, may have been carried out *ad hoc* by the garrison itself to meet its own needs (Moździoch 1991, 29). Equally significant is the absence of local ceramic production. There is no identifiable ‘Bojná-type ceramic circle’. The ceramic assemblage does not show the dominance of a single production sphere; pottery of the expected Nitra-Lupka type is no more numerous than other groups, including forms with parallels in Moravia and Lower Austria (Vanglová 2017; 2020). Thus, the idea of a clearly defined consumer circle does not work well for Bojná-Valy (cf. Štefan 2014, 162). The expected ceramic zone of Pobedim has likewise not been identified. Although recent dating suggests that Pobedim was destroyed not at the beginning but rather towards the end of the 9th century (Henning – Ruttkay 2011, 268; Robak *et al.* *in press*), its chronology remains uncertain. The possibility that Pobedim was no longer functioning as a centre when Valy was active is also being considered (Robak 2021, 62–63).

Interpreting Bojná-Valy as a site with a primarily military and logistical profile does not imply the absence of economic processes. On the contrary, nodes with a garrison function often generate a stable (or periodically renewed) demand for goods and services, thereby creating conditions conducive to the emergence of mechanisms coordinating circulation, from the standardisation of transactions to the differentiation of service spaces. In the case of Bojná, such a mechanism appears particularly plausible. On the one hand, its settlement pattern and topographical setting make it difficult to interpret within the framework of a classical agglomeration centre; on the other, the archaeological record provides indications of economic activities extending beyond the immediate provisioning of the stronghold (e.g. glass from imported vessels, lead in ingot form), while offering no support for a model of autarky. In this context, it is also worth noting an aspect that brings Bojná closer

to themes present in the work of Jiří Macháček. The impression of a rotating population and the absence of a stable ‘settlement biography’ (no developed agglomeration-type architecture, no cemetery, and a limited presence of women and children) recall Macháček’s observations on mobility and interchangeability among populations inhabiting peripheral components of agglomerations (suburban zones), which may be interpreted as areas of movement between centres and rural settlements. In such a perspective, Bojná is clearly not a ‘proto-urban’ centre, yet it may have fulfilled an analogous function on a smaller scale: as a place where people and their competencies (military, craft, and commercial) appeared and disappeared in the rhythm of service rather than that of everyday life. Notably, potters themselves do not seem to have been among the most necessary specialists at this site.

What general model? The question of political organisation

Great Moravia was characterised by a complex and distinctly transitional structure, situated between earlier, tribal forms of organisation and the more stable model of the early state typical of the Central European developmental trajectory (*Třeštík 1997*, 293–294; *Štefan 2014*, 144, 160–161). This was not, however, a simple ‘overlay’ of state institutions upon an existing tribal order, but rather the gradual emergence of a kind of ‘beta version’ of statehood – unevenly institutionalised, and understood as a durable securing of diversified income streams for a particular group. This process unfolded in stages and through visible phases of intensification, especially in the construction and modernisation of hill-forts and defensive infrastructure (cf. *Henning – Ruttkay 2011*, who nevertheless interpret the construction boom of the 890s primarily as a response to military threats; and *Kalhous 2018*, 20).

From this perspective, Bojná may be seen as a particularly illustrative fragment of this transitionality. The site of Bojná-Valy, as described above (and broadly in *Robak 2021*; *Robak – Pieta 2026*), can be interpreted as evidence for an attempt, at the end of the 9th century, to construct a durable administrative and military order within Great Moravia, which was meant to rely on a planned network of control points, mobilisation centres, and storage–logistical nodes, managed from a regional centre – in this case most likely Nitra, where a bishopric was also established in 880. In this respect, it bears a strong resemblance to early Piast castellany centres and some of their basic functions (*Moździoch 1991*, 27–31; *Grążawski 2014*, 63–65; *Przybył 2018*, 73). It is noteworthy that the hillfort at Majcichov, founded in the same years (892–893) as Bojná-Valy, lies at precisely the same distance (33.2 km) from Nitra-Hrad (*Fig. 1*). Whether this emerging system ultimately failed to stabilise is a separate and debatable issue, especially given that the name *Bana* was later adopted and maintained until the 13th century by a Hungarian county located in the same general area as Bojná. The hypothesis of central planning is further reinforced by the scale of investment. The massive fortifications, constructed using advanced technical solutions characteristic of late Great Moravian defensive architecture (including dry-stone walling), are difficult to interpret as the product of a bottom-up initiative by a local leader lacking substantial organisational backing and the capacity to mobilise significant resources (cf. *Kalhous 2018*).

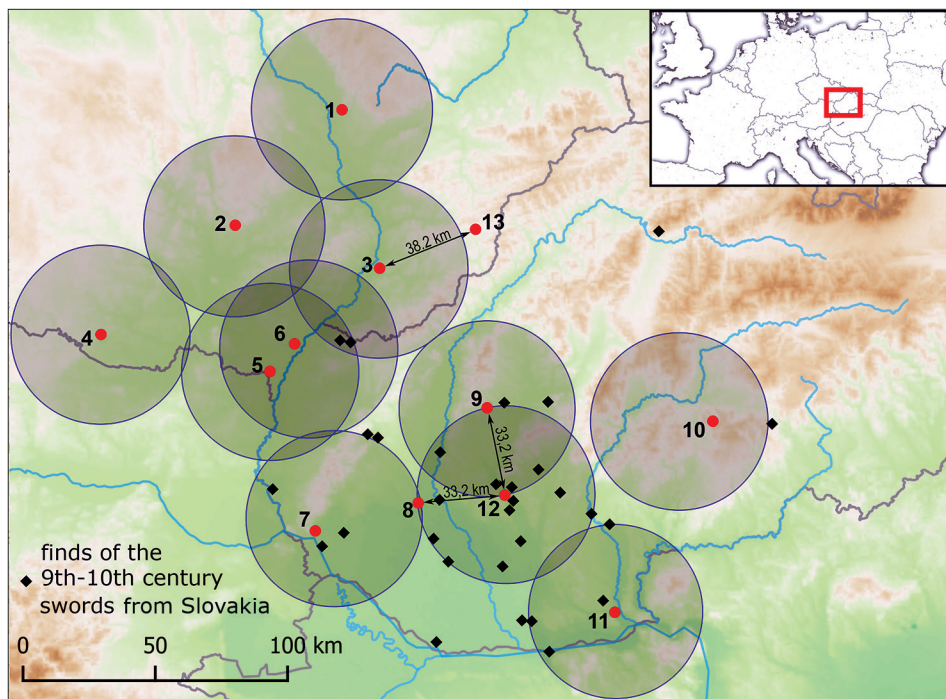


Fig. 1. Operational range (~33 km) of Great Moravian centres in the late 9th century and other sites mentioned in the text. 1 – Olomouc-Hrad; 2 – Brno-Líšeň; 3 – Staré Město; 4 – Znojmo; 5 – Břeclav-Pohansko; 6 – Mikulčice; 7 – Bratislava-Hrad; 8 – Majcichov; 9 – Bojná-Valy; 10 – Zvolen-Moťová; 11 – Biňa; 12 – Nitra-Hrad; 13 – Klášťov; black diamonds – finds of the 9th–10th century swords (after Jócsik 2024; Jócsik – Móc 2024).

At the same time, it seems likely that the Moravian core of the system functioned differently from its peripheries. In areas where agglomerations and centres (together with their resident elites) were concentrated within a relatively small space and reached the highest levels of complexity, the mechanisms of integration may have been more competitive and balanced (cf. Hladík 2020, 275, 312). It is not inconceivable that various strategies were tested in order to maintain equilibrium – among them perhaps autarkic *villae* inspired by Carolingian models. It is worth recalling that the Carolingian dynasty constituted an important point of reference for Moravian elites, providing both cultural stimulus and organisational templates.

By contrast, in the peripheral zones, more straightforward and effective solutions may have prevailed, in which recognised central authority was represented by a single agent linked to a local centre. This perspective may help to explain the emergence of small, isolated ‘manorial’ sites at Nitrianska Blatnica and Ducové – forms of spatial organisation that find no direct parallels in Moravia itself.

At this point, Bojná also becomes a useful case through which to pose a more fundamental, ‘constitutional’ question – one that lies at the heart of the Macháček–Hlavica debate. Could such a large and technologically advanced stronghold have been established and maintained without strong central coordination? If one adopts a more polycentric and

‘coopetitive’ vision of the political order (closer to that of Michal Hlavica), it becomes necessary to explain why other centres would have tolerated the emergence of such a control point, or how they would have contributed to its provisioning and staffing without recourse to coercion, obligations, or overarching coordination.

This question does not constitute an argument against the market as such, but rather against the proposition that a local market, left to itself, would have been capable of sustaining a node of such scale and power in so inconvenient a location, particularly in the absence of strong institutions able to enforce or at least stabilise supply flows, evidently without undermining the viability of local agricultural producers (through mechanisms such as dues, contracts, obligations, or control over routes). Although the multi-layered and complex models proposed by *Hlavica (2023)* are undoubtedly valuable in that they allow for the comprehensive testing of diverse cases, one may gain the impression that they leave too much room for interpretations invoking self-regulating market mechanisms. The same archaeological data can often be explained equally well through politically coordinated mechanisms (cf. *Štefan 2014*, 145–146, note 6). In this sense, the flexibility of the model may function as a kind of shield against falsification: almost any distribution pattern can be described as ‘market-based’, provided that one allows for a mixture of mechanisms and shifts the explanatory weight onto loosely defined ‘processes’ operating within a network.

If Bojná were to be interpreted as (I) a ‘regional market’, one would expect its influence to be visible within the micro-region as a service zone: goods arriving at the stronghold should subsequently appear in dispersed form in surrounding settlements, while patterns of provenance would display a zonal, stable, and repeatable character. At present, such a pattern can be identified primarily in relation to military equipment (*Robak 2018; 2023*), whereas no comparably unambiguous evidence is available for other categories of goods. If, on the other hand, Bojná functioned primarily as (II) a ‘dendritic node’, one would expect rather a corridor-like pattern: supplies arriving from multiple sources into the centre, without a clear signal of outward redistribution, and with a concentration of coordinating instruments within storage and logistical contexts. At the current stage of research, the available data lend stronger support to this second hypothesis.

The logistical character of provisioning does not exhaust the range of possible interpretations. First, a military node generates sustained demand not only for food, but also for services and the production of specific categories of goods. The archaeological material recovered from Bojná-Valy provides strong evidence in this respect. Within the *suburbium*, features and concentrations of finds indicative of ironworking have been recorded (including numerous fragments of slag, as well as fragmentary and bent axe-shaped ingots, large quantities of scrap metal, and blacksmithing tools). This would correspond to a zone of workshop activity servicing the needs of the stronghold. In comparative terms, it is important to note that such a functional zone may resemble the voluntary ‘camp-following’ service areas (*vicus*-like) known from other contexts. By definition, they do not necessarily constitute a regional market, but rather spaces in which service and production activities converge with demand generated by a military institution and, more generally, with opportunities for exchange and private profit (*Hanel 2007*). A potentially relevant parallel with Macháček’s bottom-up perspective concerns the capacity of concentrated demand to generate economic activity from below (e.g. *Kim et al. 2024*). A permanently or periodically occupied military node would have created demand for food, repairs, craft products,

various services, etc. Part of this demand may have been met institutionally, while another part could have stimulated voluntary, small-scale activities involving inhabitants of the surrounding region. In this sense, local market-like activity need not have constituted the mechanism responsible for the emergence or maintenance of the centre. It may instead have developed secondarily around an institutionally maintained garrison.

For the sake of interpretative balance, however, it is necessary to consider a counter-argument: the possibility that Bojná, alongside its defensive and logistical functions, simultaneously operated as a production node, in which iron smelting and/or working, as well as the manufacture of weaponry, constituted one of its principal outputs entering wider circulation. Such an interpretation is all the more plausible given that the site of Bojná-Valy and its surrounding area provide clear evidence of metallurgical and smithing activity (including traces of extraction, *tuyères*, slag, workshop areas, concentrations of waste, and hundreds of axe-shaped ingots). Its location within a resource-rich zone (*Robak in press*) would have favoured the placement of production of strategic importance. Yet production itself (and even the potential exchange of iron) does not demonstrate the existence of market mechanisms. If the production node remained under the control of political authority (as might be suggested by the permanent presence of a military force and the scale of the fortifications), then the distribution of its outputs may have operated through coordination by authorities rather than via an open market or negotiated exchange of the ‘iron for food’ type. In such a scenario, iron (and other metals) would function primarily as a politically managed resource – a material for weaponry, a tool of control, and a marker of prestige, while any exchange with the surrounding population would be secondary and segmentary, serving to secure provisioning and services rather than to enable self-regulating allocation at a regional scale. Dependence on external supplies and the absence of local production of certain everyday goods may thus create an impression that can easily be interpreted as ‘market-like’, although it may in fact result from entirely different mechanisms. From a methodological perspective, this constitutes a classic case of equifinality in the interpretation of archaeological indicators. This problem has already been encountered in the analysis of ceramic distributions in Moravia, as the same empirical pattern may arise either from a ‘market’ (in the sense of open exchange) or from ‘provisioning’ (in the sense of coordinated supply to a node).

At the same time, Bojná meets some of the ‘boundary conditions’ considered important by Michal Hlavica, particularly if it is viewed as a potential bottleneck – a node in which control over space (passes, routes) favours not necessarily the development of an agglomeration, but rather the concentration of flows, and thus also the monopolisation of selected goods and the benefits of mediation. In this light, one may interpret both its strategic position along the transit axis linking Staré Město and Nitra, as well as its location on the theoretical northern boundary of the Nitra ‘region’, together with its pronounced military and control component, which may have served not only defensive purposes but also the appropriation and management of territory. If, in addition, one takes into account the indications of the long-term significance of the Bojná landscape (as suggested in *Robak in press* and *Robak – Pieta 2026*, where a possible symbolic and ceremonial component predating the Great Moravian phase was proposed), then the later military function does not contradict this interpretation, but rather provides a logical mechanism for its stabilisation. A garrison, in this sense, operates as an instrument of security, control, and the political legitimisation of claims to space. One possible consequence of such an interpretation would

be a reconsideration of the origins of the nearby manorial site and rotunda at Nitrianska Blatnica (Robak 2024), understood as the residence and maybe private property of the controller of the Valy stronghold.

Finally, the evidence of imported goods (such as glass), monopolised items, and standardised goods, such as axe-shaped ingots (and possibly sickles), lead weights, or lead ingots corresponding in weight to the Carolingian pound (Robak *et al.* 2026), may be interpreted as the coexistence of two distinct phenomena: (1) selective demand for, control over, and monopolisation of specific flows (the ‘bottleneck’ logic), and (2) segmentary exchange of goods and services stimulated by the additional demand generated by the garrison, potentially including partly bottom-up activity, for example in the form of a kind of grassroots entrepreneurship. I would, however, remain cautious about treating these categories of finds as unambiguous indicators of a market. Standardised weights, weighing devices, and imported goods may occur both within systems of market exchange and within controlled redistribution, storage, the accounting of raw materials, or other forms of coordinated distribution.

In this configuration, Bojná appears less as a fully developed market centre and more as a node in which coordinated resource management (measurement, accounting, storage, and craft activity) and increased flows of goods resulting from concentrated military demand could jointly generate ‘market-like’ behaviour (Shaw 2012; Kim *et al.* 2024). Such exchange could therefore be economically genuine without constituting the primary mechanism through which the centre itself was created, supplied, or integrated into the wider political system. It is precisely this interplay of mechanisms of redistribution and politically coordinated provisioning, monopolisation at bottlenecks, and exchange within service zones that makes Bojná particularly valuable as a test case for both Macháček’s triad and Hlavica’s model, provided that these are not treated as zero-sum alternatives.

The case of Bojná does not so much refute the models proposed by Jiří Macháček and Michal Hlavica as it compels their reformulation. Rather than choosing between ‘market’ and ‘redistribution’, the more pertinent question is what type of node is being analysed and which logic of integration was most appropriate to it. In this sense, the two models need not be regarded as mutually exclusive. Bojná allows for the precise formulation of a hypothesis addressed in the Macháček–Hlavica debate without reducing it to a simple dichotomy.

From the perspective of Macháček’s triad, the site fits poorly with both model 1 and model 2, while it appears closest to model 3 – though only superficially, since the available data do not support the interpretation of local exchange as the primary mechanism integrating the system as a whole. This raises the possibility that the triad itself may be insufficient and that additional models should be considered. From Hlavica’s perspective, Bojná may indeed function as a ‘bottleneck’ and may even generate ‘market-like’ signatures. However, their origin need not be market-based in the sense of the CPT, but may instead derive from military function, logistics, and institutional coordination. In this respect, Bojná does not so much confirm or falsify the existence of a market as such, but rather compels a conceptual distinction between institutions of exchange and the existence of a market as a mechanism of regional economic integration.

As a side note and a recommendation for future research, it is worth observing that Bojná’s location and the range of its direct influence may correspond to the scales of interaction expected within central place models (Evans 1980, 870; fig. 1; Hlavica – *Pro-*

cházka 2020; Hlavica 2023, 48; fig. 14). If CPT is applied, this configuration corresponds to the transport principle, $k = 4$, in which a centre is located not in the middle of its own consumer zone or in an area particularly favourable for agriculture, but in a position advantageous from the perspective of communication – in this case, along the combined riverine and overland route linking Nitra and Staré Město. If Bojná had functioned primarily according to the market principle, $k = 3$, one would expect it to have served a relatively regularly distributed population within its own hinterland – settlements, producers, and consumers. So far, however, no such immediate and densely settled hinterland has been identified around Bojná.

It should also be clarified that the radius of approximately 35 km proposed by Hlavica as the sphere of a centre's influence is both realistic and methodologically sound, yet it does not correspond to a half-day travel norm. Rather, it reflects the range of so-called effective political control in pre-industrial societies (*Spencer 2010, 7119–7120*), i.e., a distance that could be covered within several hours under conditions of necessity, though not necessarily by the same individual. A range of studies on communication in prehistory and the medieval period (including analyses of the distribution of toll stations, networks of hillforts, and similar infrastructures) indicate that the daily travel limit for a pedestrian carrying a load was approximately 30–40 km, a comparable distance for ridden and pack animals (which also travel on foot, tire easily, and were costly), and around 20 km for wheeled transport (*Christaller 1966, 118; Bachrach – Aris 1990; Robak 2009, 182*). The measure of 20 miles (32.19 km) also recurs frequently in the early medieval period as an operational unit allowing for the effective mobilisation and movement of forces within a single day under typical conditions (*Abels 1988, 68–71*). Accordingly, it is useful to employ the concept of an operational range (32–35 km), which should not be conflated either with the area actually controlled by a given centre – this being dependent on other factors such as political decisions or geographical constraints – or with its immediate settlement and economic hinterland.

The distribution of most finds of belt fittings of the Bojná type, the only category of artefact that can currently be identified as a product made in Bojná-Valy (*Robak 2023*), falls within a circle of approximately 35 km in radius. At a comparable distance lies the hillfort of Dolné Vestenice II, where artefacts made of lead originating from the same source as the large ingots discovered in the Bojná hoard have been identified (*Robak et al. 2026*). If these observations are confirmed and further refined through provenance studies and the analysis of distribution networks, they may provide a rare empirical foothold for distinguishing whether we are dealing with a 'service zone' in the sense of a market or central place, or rather with a radius of influence resulting from logistics, control, and supply channels.

According to Jiří Macháček, Great Moravian centres were subsistentially dependent on their agrarian hinterlands, with which they were not connected through market relations in the sense of a dominant exchange mechanism; the transfer of goods was institutional and socially embedded, even if relations between centre and village could be subject to negotiation. For Michal Hlavica, by contrast, economic relations formed the principal axis of interaction. It is, however, fairly clear that Great Moravian agglomerations and their immediate surroundings constituted a single, integrated socio-economic system (cf. *Hladík et al. 2022*). Both approaches, however, tend to overlook non-economic factors that may have influenced the formation of networks (cf. *Siemianowska 2014, 33–34*).

It is within this broader frame that ‘jokers’ appear: sites such as Bojná (and perhaps also Klášťov, mentioned by Hlavica, see *Fig. 1*) which operate outside the classical agglomeration–hinterland model and according to logics tailored to unique conditions. These sites do not simply fail to fit the model. Rather, they introduce interpretative complications, as they seem to fulfil functions requiring different modes of provisioning and control. Their uniqueness makes it difficult to assign them to any established model. Location at the intersection of spheres of influence – for example, between Nitra and Pobedim in the case of Bojná (assuming the synchronicity of all three sites) – and effectively at the boundary of geographical structures (*Robak in press*) suggests that these sites may have been deliberately situated ‘at the edge’ of systems, or even just beyond them, as artificial extensions of central authority. They could serve as delegations of power, in the case of Bojná primarily military, in other cases perhaps economic (cf. the Břeclav–Pohansko – Mikulčice configuration in *Hlavica 2023*, 50; *Hladík 2020*, 312). It would be particularly interesting to investigate whether more such paired configurations can be identified in the late phase of Great Moravia (e.g. Biňa – Mužla–Čenkov).

It is also worth considering whether some of these arrangements may have functioned as ‘gateways’ (*Burghardt 1971*; *Westerdahl 2006*), i.e., sites peripheral to a given settlement territory, yet of considerable importance for long-distance connections, located as entrance points to producing regions. Alternatively, some of these configurations may represent survivals of earlier spatial arrangements. For example, the centre of the Bratislava region, whose role as a central place at the beginning of the 9th century remains questionable, and which may instead have functioned as a ‘gateway’ (cf. *Hladík et al. 2022*, 127; *Robak et al. in press*; see also *Burghardt 1971*, 280 for later periods), appears to have been located in the vicinity of Svätý Jur. Meanwhile, Pobedim fits well into classical patterns (a centre located in a river valley) and into Moravian-type configurations that may already have been forming at the turn of the 8th and 9th centuries (*Fig. 2*). At the same time, however, the sphere of influence of Pobedim clearly overlaps with that of Nitra. The configuration Pobedim (–Bojná–) Nitra thus represents a particularly striking case of spatial tension, and it is possible that the location of Bojná and the desire to control its surroundings was not without significance in this context. This opens up a range of further research questions. How did the still-functioning Avar Khaganate influence the formation of this system in the early 9th century (*Szenthe 2019*; *Szenthe – Gáll 2021*), especially given the presence of one of its settlement-production centres at Komárno (*Zábojník 2025*)? Could this have contributed to a northward shift in the sphere of interests associated with Nitra? Might Nitra, situated precisely on the cultural frontier of the Khaganate, initially have functioned as a ‘gateway’ for the middle Nitra region, with a centre at Bojná (notably Bojná III Žihľavník), only later giving way to a reconfiguration in which Nitra assumed primacy? Gateway theory explicitly allows for such a trajectory (*Burghardt 1971*, 272–273, 285).

I also diverge from Jiří Macháček in assessing the scale of ‘bottom-up negotiability’ in centre–village relations. The claim that temporary and conditional military assistance from armed villagers could have constituted a central element of negotiation with the centre, and that rural populations need not have been subordinated, does not seem to sufficiently account for the need for stable mechanisms enforcing obligations in the context of resource mobilisation in early medieval societies. It is, of course, possible to assume that large agglomerations did not always have to rest upon a rigid, authoritarian hierarchy, and that

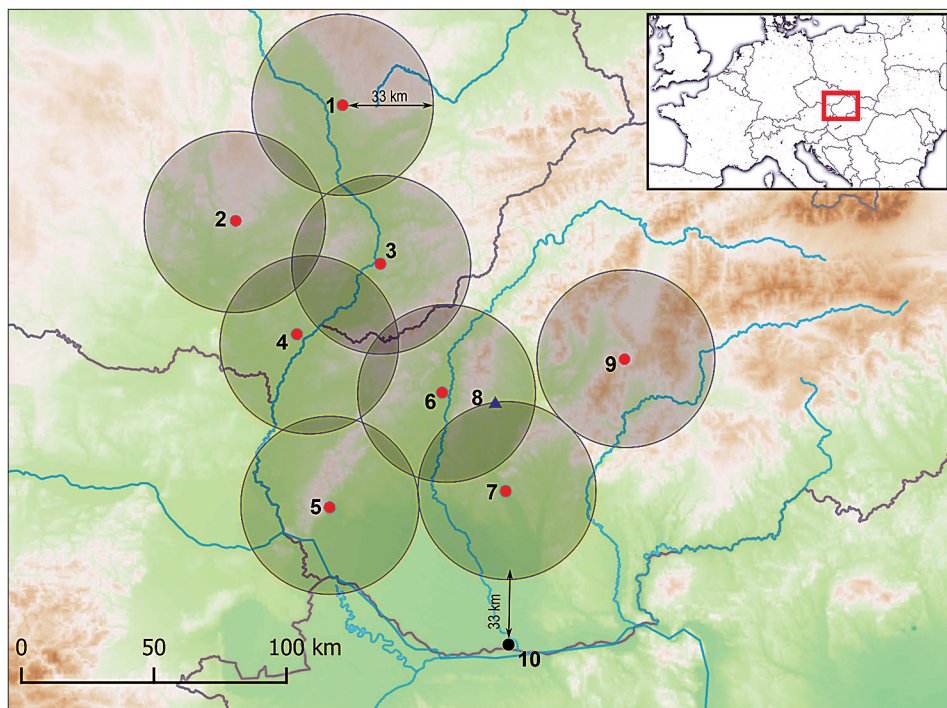


Fig. 2. Operational range (~33 km) of Moravian and Nitran centres in the early 9th century and other sites mentioned in the text. 1 – Olomouc-Povel; 2 – Brno-Líšeň; 3 – Staré Město; 4 – Mikulčice; 5 – Sv. Jur-Neštich; 6 – Pobedim; 7 – Nitra (Hrad?); 8 – Bojná-Žihlávnik; 9 – Prievidza-Hrade; 10 – Komárno.

elements of cooperation and reciprocity may have played a role. In practice, however, the maintenance of centres and the functioning of control nodes required stable and repeatable flows of obligations – conditions difficult to sustain solely on the basis of voluntariness or *ad hoc* ‘social contracts’. Where any activities are costly, cyclical, and burdensome, they typically require institutions of enforcement, at least in the form of continuous oversight, the threat of sanctions, and the regulation of flows. From this perspective, sites such as Bojná do not contradict the model of dependence on the hinterland; rather, they underscore the extent to which Great Moravia (particularly in the later phases of its existence) constituted a highly complex system. This system was most likely hierarchical-networked and functionally differentiated. Its core may have rested on relatively balanced centre-hinterland relations, while its peripheries and boundary zones were characterised by specialised military, logistical, and control sites operating according to a different logic.

The model proposed by Jiří Macháček nevertheless appears more plausible as a description of the underlying principle of the system, not least because comparable arrangements, namely the dependence of centres on their hinterlands and institutional mechanisms for enforcing obligations, are well attested in later phases of early state organisation in Central Europe, and are therefore known to have functioned effectively (e.g. *Moždziach* 1999; 2002, 220–225). One hypothesis requiring further verification concerns the possibility that individual graves containing swords in rural cemeteries may represent traces of

control systems. It is difficult not to observe that in Slovakia the distribution of 9th- and 10th-century sword finds is both concentrated and regular within an area of approximately 33 km in radius from Nitra (*Fig. 1*), which is effectively the only site on the eastern flank of Great Moravia with central functions comparable to those of the Moravian strongholds. This distribution corresponds closely to the communicative-administrative principle underlying Walter Christaller's model of central places (*Christaller 1966*, 63–66). It is therefore worth considering whether such finds might be interpreted as material indicators of individuals performing supervisory or controlling roles – either installed or appointed by the centre – whose maintenance was effectively transferred from the ruling authority to the local community (*Robak 2018; Macháček et al. 2021*, 279–281). Their function may have been to ensure the regular fulfilment of obligations without the need to resort to punitive expeditions only at the moment of attempted 'renegotiation' or open rebellion and the interruption of supply flows. This interpretation does not exclude the hypothesis advanced by Štefan (*2011*, 337) regarding a parallel stratum of *Bauernkrieger*. Rather, it offers a possible explanation for the disappearance of this group following the collapse of the system. Whether such individuals were recruited locally, which might suggest a degree of erosion within local communities (*Macháček et al. 2021*, 281; *Macháček 2026a*, 100), or originated from outside, thereby reducing the risk of clientelism and local entanglements, remains a secondary question. The verification of such hypotheses represents a promising avenue for future bioarchaeological and archaeogenetic research.

Conclusion

The case of Bojná demonstrates that the triad proposed by Jiří Macháček for central agglomerations is useful as a point of departure, yet insufficient when confronted with sites of non-standard functional profiles. Bojná, if interpreted as a typical central place, would fit poorly within the subsistence model of a fully developed agglomeration with an agrarian hinterland, because it lacks a clearly defined internal hinterland. It also corresponds inadequately to the autarkic model, since the available evidence does not support its self-sufficiency, even *Umland*. Centres such as Bojná may have, however, generated genuine, voluntary market activity without themselves having emerged through market mechanisms or being sustained primarily by them (cf. Klášťov, which occupied a position relative to Staré Město analogous to that of Bojná relative to Nitra). In this sense, I distinguish between a market sustaining the centre and a centre generating opportunities for exchange. This does not mean, however, that a centre belonging primarily to a non-market network cannot be useful for discussing the functioning and stimulation of market activity (cf. *Robak et al. 2026*).

At first glance, it appears closest to the model of a local agglomeration market; however, this variant likewise proves insufficient if local exchange cannot be regarded as the principal mechanism integrating the system as a whole. At the same time, this case partly supports the intuitions of Michal Hlavica, as it demonstrates that different mechanisms may coexist: institutional provisioning, control over strategic goods, segmentary exchange, and local craft-based services. At the same time, however, Bojná exposes the weakness of an overly broad application of the concept of the market. If almost any configuration of exchange and circulation can be described as 'market-based', there is a risk of losing the

analytical distinction between the market as a mechanism of integration and exchange as a secondary product of logistics and control. In this sense, Bojná does not so much falsify a particular model as compel us to ask what type of node we are dealing with and which logic of integration was appropriate to it. The interpretation of Bojná as a highly specialised military-logistical node therefore remains a hypothesis, but, in my view, one that is consistent with the current state of the evidence and open to further testing, analysis, and discussion.

If the proposed interpretation of Bojná is accepted, the Great Moravian system does not appear as one integrated by a single, exclusive mechanism. A hierarchical-networked and functionally differentiated model seems more plausible. Its core may have been based on classical centre–hinterland relations, redistribution, and to some extent local exchange, while in peripheral and boundary zones there also operated specialised military, logistical, and control nodes. These centres were not ‘failed agglomerations’, but rather a different category of delegated centres, organising space and flows in ways not fully consistent with the classical central place model. From this perspective, the dominant integrative force of the system still appears to have been the institutional mobilisation of resources, although its specific forms may have varied regionally and, in certain areas, coexisted with limited market exchange (segmental or micro-market). We are therefore dealing with a centre generating opportunities for exchange rather than a market sustaining the centre. Bojná therefore does not invalidate the model of dependence on the hinterland; it demonstrates that such dependence could also be organised through specialised nodes located outside the classical agglomeration framework.

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